# Introduction to Formal Reasoning and Decision-Making (Online Course)

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Philosophy 109
May 26 – July 3, Summer 2020
Office hours: Th 12-1 and by appt.

## Course Description

Reasoning is one of the most important activities in which humans engage. We form arguments for the ideas, beliefs, and views which we have. We argue against alternative ideas, beliefs, and views. But what makes some arguments good, and other arguments bad? More generally, what rules ought to govern reasoning?

In this course, students will learn a theory of reasoning—called 'propositional logic'—which addresses these questions. We will focus on natural language arguments, formal language arguments, formal and informal characterizations of validity, some characterizations of soundness, and techniques for extracting arguments from texts.

## Two Versions of the Course

Because of the pandemic, I am offering students the option of taking either of two different versions of this course. Roughly put, students who take the 'pandemic' version will (i) have fewer homework problems, and (ii) be graded more leniently. Students who take the 'non-pandemic' version, however, will have more homework problems, and they will be graded more strictly.

For more details about these different versions, see the pdf "Two Versions of the Course": on canvas, this pdf is located in the "Policies" folder (which is contained in the "Files" folder on the left side of the screen); on my course website, this pdf is located under "General Documents". Those websites are below.

1. Canvas course website: https://rutgers.instructure.com/courses/58583
2. My course website: isaacwilhelm.com/teaching.htm

Students must tell me, by 11:59pm on Friday May 29, which version of the course they want to take.

## Course Requirements

The requirements for this course can be sorted into two groups: graded, and ungraded. You will not lose any points if you do not complete the ungraded requirements. But I strongly recommend that you complete them: they consist of tasks which will help you succeed in

this course.

Graded requirements

1. Weekly questions (10 points each)
   - Each week, you must post one question to the canvas website.
   - The question must be about the material covered in the handout, the assigned reading in the book, or the homework, for that week.
   - Each week, you must submit your question by 11:59pm on Thursday.
2. Weekly lectures (10 points each)
   - For each of weeks 1-5, there will be one online lecture.
   - Each lecture will take place at 10am on Friday.
   - You must attend the lecture, or watch the recorded video, before submitting your homework for that week.
3. Homework (50 points each)
   - Homework will be assigned for each of weeks 1-5.
   - Each week, you must submit your completed homework problems by 5pm on Saturday.
4. Final exam (150 points)
   - The final exam will be held at 10am on July 3.

Ungraded requirements

1. Introductory lecture
   - During the first week, there will be one online lecture.
   - The lecture will take place at 10am on Tuesday.
   - You must attend the lecture, or watch the recorded video. It will contain a lot of helpful information about the course.
2. Readings
   - Each week, you must read a certain portion of the course textbook. The readings, and the date by which they must be completed, are listed under the 'Schedule' section at the end of this syllabus.
   - Each week, you must read the handout for that week. The handout must be read by 11:59pm on Friday.
3. Review questions for week 6
   - During the sixth week, you must post two questions to the canvas website.
   - The question can be about any of the material covered in the course.
   - The first question must be submitted by 11:59pm on Monday, and the second question must be submitted by 11:59pm on Wednesday.
4. Review lectures
   - During the sixth week, there will be two online lectures.
   - The first lecture will take place at 10am on Tuesday, and the second lecture will take place at 10am on Thursday.
   - You must attend each lecture, or watch the recorded video, before the final.

**Late Assignments, Make-Up Work, And So On**

Long story short, late work will *not* be accepted, extra credit will *not* be provided, and there will be *no* opportunities for make-up work. For a more precise, detailed description of these policies—and other course policies too—see either the canvas course website or my course website.

**Goals for the Course**

By this course's conclusion, you should be able to

- translate natural language arguments into arguments in propositional logic,
- distinguish valid arguments from invalid arguments,
- extract arguments from texts, and
- discuss complex philosophical ideas respectfully.

**Plagiarism and Academic Integrity**

Please adhere to the Rutgers University policies on plagiarism and academic integrity. Penalties for violations of these policies can be severe: they include an automatic failing grade for the course, and possibly worse. A comprehensive overview of these policies can be found at http://academicintegrity.rutgers.edu/academic-integrity-policy/.

**Accessibility**

This class should be a great, fun, and educational experience for everyone. And of course, everyone deserves equal access to all educational opportunities at Rutgers. Disabled students are encouraged to speak with me if that would be helpful, and to avail themselves of the resources provided by the Office of Disability Services (https://ods.rutgers.edu/).

**Schedule**

The readings will be drawn from two sources: handouts that I have written, and the textbook *forallx: Calgary Remix* by Magnus and Button. The textbook is free and available online: for your convenience, I have posted it to the course's Canvas website. The handouts will be posted to both of the course's websites.

In the schedule below, I specify (i) the dates and times of various online lectures, (ii) the dates by which various portions of the textbook should be read, (iii) the due dates of various weekly questions, (iv) the due date for each homework, and (v) the date and time of the final. The handout for any given week can be read at any time during that week; I recommend reading it before doing the homework, however.

**0. Introduction**

- May 26: introduction to the course.
  - Lecture at 10am.

**1. Natural Language Arguments**

- May 27: natural language arguments. Read *forallx* (Magnus, Button), "Chapter 1: Arguments".
- May 28: week 1 question due by 11:59pm.
- May 29: valid, invalid, sound, and unsound arguments in natural language. Read *forallx* (Magnus, Button), "Chapter 2: Valid arguments".
  - Lecture at 10am.
- May 30: homework 1 due by 5pm.

**2. The Formal Language**

- June 1: the symbols of the formal language. Read *forallx* (Magnus, Button), "Chapter 4: First steps to symbolization".
- June 3: sentences in the formal language. Read *forallx* (Magnus, Button), "Chapter 6: Sentences of TFL".
- June 4: week 2 question due by 11:59pm.
- June 5: translation into the formal language. Read *forallx* (Magnus, Button) "Chapter 5: Connectives".
  - Lecture at 10am.
- June 6: homework 2 due by 5pm.

**3. Truth and Validity**

- June 8: truth tables for the five connectives. Read *forallx* (Magnus, Button), "Chapter 8: Characteristic truth tables".
- June 10: truth tables for sentences. Read *forallx* (Magnus, Button), "Chapter 10: Complete truth tables".
- June 11: week 3 question due by 11:59pm.
- June 12: validity. Read *forallx* (Magnus, Button), "Chapter 11.4: Entailment and validity".
  - Lecture at 10am.
- June 13: homework 3 due by 5pm.

**4. Natural Language Arguments and Formal Arguments**

- June 15: using formal arguments to evaluate natural language arguments.
- June 17: using formal arguments to evaluate natural language arguments (again).
- June 18: week 4 question due by 11:59pm.
- June 19: the pros and cons of using propositional logic to guide reasoning in natural language. Read *forallx* (Magnus, Button), "Chapter 11.5: The limits of these tests".
  - Lecture at 10am.
- June 20: homework 4 due by 5pm.

**5. Extraction**

- June 22: extracting arguments from sample texts.
- June 24: extracting arguments from sample texts (again).
- June 25: week 5 question due by 11:59pm.
- June 26: extracting arguments from sample texts (again).

  - Lecture at 10am.
- June 27: homework 5 due by 5pm.

**6. Review and Final**

- June 29: review question due by 11:59pm.
- June 30: review lecture at 10am.
- July 1: review question due by 11:59pm.
- July 2: review lecture at 10am.
- July 3: final exam at 10am.