

Introduction to Formal Reasoning and Decision Making

Philosophy 109:03 (Spring 2019)

Instructor: Dr. Max Bialek

Lecture: MTh 9:50–11:10am

Location: CA-A5

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Office Hours: TBA

Office Hours Location: Miller Hall 211

Course Description. “Fundamentals of logical, probabilistic, and statistical thinking, as well as the basic principles of rational decision making. Reasoning through data (and rhetoric) encountered on a daily basis using elementary principles of deductive logic and inference.”

Resolving differences of opinion isn’t always impossible. Figuring out what you should believe isn’t just a matter of checking what’s true. Deciding what you should do doesn’t have to be left up to your whim. Formal tools have been (and continue to be) developed that enable us to talk very precisely about the strength of arguments and of evidence, the rationality of beliefs we have, and the value of choices we make.

This course will introduce students to some of those formal tools and their applications to formal reasoning and decision making: Formal Logic will be used as a model for expressing ourselves carefully and judging deductive arguments. Probability and Statistics serve as tools for making inductive inferences, evaluating evidence, and quantifying risk and uncertainty. Decision Theory will provide a system that employs those logical and probabilistic tools in order to help guide our decision making. For all of these, we will also discuss their peculiarities, limits to their application, and their potential for expansion and sophistication.

Course Materials. We will be working from a mixture of the course textbook—*Choices: An Introduction to Decision Theory* by Michael Resnik (ISBN: 9780816614400)—and notes provided by the instructor that will be posted to the course website.

Course Website. The course website is done through Canvas, and is available directly at [TBA].

Course Requirements & Grading. There will be 7 assignments, each worth 5% of the course grade. The lowest assignment grade will be dropped, for a total of 30% of the course grade. These may range in style from quizzes and homework assignments to more unusual fare, like developing a potential exam problem.

Each module will end with an exam worth 20% of the course grade. A comprehensive final exam will be worth 20% of the course grade. The lowest exam grade will be dropped, for a total of 60% of the course grade coming from exams. This means that if you bomb an exam, you can make up for it with the final, or if you are happy with your grade going into the final, you can skip it.

In-class participation will count for 10% of the final course grade. This will be based primarily on turning in small in-class activities (e.g. an example problem from lecture or the record of some group discussion).

In short:

10% — Participation

30% — 6 Assignments at 5% each (best of 7)

60% — 3 Exams at 20% (best of 3 Module-Specific Exams and 1 Comprehensive Final)

Late Assignments. Any assignments turned in late will have 20% of the maximum potential score will be subtracted from the initial score (e.g. a late assignment that would have received 85/100 will instead get 65/100).

Attendance. Attendance is expected. If you miss a class, you might miss an activity counting towards the Participation grade. If you expect to miss any classes, please use the University absence reporting website (<https://sims.rutgers.edu/ssra/>) to indicate the date(s) and reason(s) for your absence.

Accessibility and Accommodations. Any needed accommodations or issues affecting your academic performance should be brought to the attention of the instructor as soon as possible. Consult with any of the following offices for help or more information.

- Academic Advising (<http://sasundergrad.rutgers.edu/advising/what-is-advising>)
- Health and Counseling (<http://health.rutgers.edu/medical-counseling-services>)
- Office of Disability Services (<http://ods.rutgers.edu>)

Unpleasantries. You should make sure you are familiar with the rules regarding proper academic conduct as detailed at <http://academicintegrity.rutgers.edu>

NOTE: You may be encouraged to work together on some assignments for this course, but material that is turned in must be prepared independently (e.g. don't just change the name at the top of the same paper), and the names of your collaborators should be listed.

Schedule. Below is a rough schedule for the course. Check the course website at least once a week for updates and any possible changes.

Formal Logic. Jan 24 (first day of class) – Feb 21 (Exam 1)

Probability and Statistics. Feb 25 – Mar 28 (Exam 2)

Decision Theory. Apr 1 – May 2 (Exam 3)

Final Exam. May 13, 8-11am, location TBA; Review day on May 6 (last day of class)