Collaborative teaching initiative proposal:  
Philosophical foundations of probability and decision theory

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Faculty member: Adam Elga  
Graduate student: Alexander Meehan  
Semester in which proposed course will be offered: Spring 2019

Rationale: To our knowledge, no current Princeton course focuses on the philosophical foundations of probability theory and the applications of that theory for decision theory, statistics, and the philosophy of science. These topics are a rich area for exploration, providing students the chance to develop technical tools and grapple with abstract mathematical and philosophical puzzles, and also to apply those tools to real-world applications including practical ethics, public policy, and the methodology of science.

Outline of content: We plan to cover the following topics:
Introduction to probability theory, interpretations of probability (major interpretations such as the objective interpretation, subjectivism, and frequentism, and criticisms of these), introduction to Bayesian decision theory (including a critical discussion on the nature of utilities), applications of decision theory to ethics (such as decision-theoretic consequentialism), puzzles arising from unbounded utilities (including the St. Petersberg Game and the Pasadena Game), foundations of Bayesian statistics (including the reference class problem), statistical evidence and the law (including proposed justifications for the law to treat merely statistical evidence differently than other evidence), the analysis of objective chance, and (time permitting) pragmatic and non-pragmatic defenses of Bayesianism.

New or revised: New 300-level undergraduate course

Changes in teaching methods to increase student engagement:

Because of the mix of technical and non-technical material in the class, we propose a nonstandard format that would enable significant development of a single topic within a session, while avoiding long segments of lecturing. The plan is to use a 3-hour seminar format to enable sufficient development of an idea during a single meeting session, but also to divide that session into many segments to attack that idea from multiple angles. Each session will include:

- Short (10-15 minute) mini-lecture segments interspersed with small-group discussion segments and in-pairs problem solving segments.
- Incorporation of argument maps, where appropriate. (We made extensive use of argument mapping in PHI 313 in Fall 2017, a class for which Meehan was Elga’s AI.)

In parallel with Elga’s ongoing work on diversifying class participation, we plan to use a number of nonstandard ways of eliciting student input during group discussions. Those ways include...
use of a software tool to signal participation, as well as an "opt-out" convention for indicating willingness to speak.

Requirements for the course: We propose to not limit the course to philosophy majors, but to ask for course applications in order to (1) ensure that enrolled students will not be overwhelmed with the more mathematical elements of the course, and (2) facilitate a seminar composition that is as balanced as possible.

Description of the division of labor between the faculty member and graduate student:

- Preparation of syllabus and design of course structure: collaborative.
- Mini-lectures during seminar sessions: responsibility divided evenly.
- Leading small-group discussions: often Elga and Meehan will simultaneously lead discussions, each teaching half of the students. Responsibility for leading full-group discussion will be divided evenly except that occasionally an enrolled student will lead a portion of a class discussion.
- Preparation of paper topics and exam questions: collaborative.
- Grading: grading tasks divided evenly.

A brief statement by the faculty member about how they plan the proposed pedagogical mentoring in developing and teaching the course, which should include meetings scheduled outside of class as well as consultation with the McGraw Center staff;

Meehan was AI for Elga's PHI 313 class in Fall 2017. With the kind support of the McGraw Mentoring Fund, we met frequently (approximately every week, scheduled at a regular time) to check in about how the course was going, adjust the direction and pace of the coverage, and discuss any students who were struggling or doing particularly well. We also had a few longer meetings to (1) coordinate on a lecture that Meehan volunteered to give for the course and (2) calibrate paper-grading. (Although the detailed lecture material was designed by Meehan, it reflected topic guidance and presentation advice from Elga.) We propose to continue in much the same manner, except that (1) Meehan would have a more active role in the choice of course content and pace, and (2) at least one initial planning meeting will be done in collaboration with a McGraw center staff member.

A statement by the graduate student about goals for participating in the initiative.

Statement by Alexander Meehan:
In AIing for Prof Elga this semester, I learned an innovative, non-standard approach to teaching philosophy, one which seems to successfully engage students. I'm excited to build upon the teaching methods that Prof Elga and I have honed, and apply them to a seminar format. To that end, my main goal for this collaboration is to follow through on this basic idea – to provide the students a unique, engaging setting for learning and discussing the philosophy of probability.
I also hope to grow as an educator. Prof Elga is a dedicated teacher and I foresee continuing to benefit from his experience and advice. The process of regularly planning, preparing and presenting material, in addition to facilitating seminar discussions, will be a genuinely new experience over and above precepting. It will also serve as valuable preparation for teaching roles after graduate school.

Lastly, I hope to grow as a researcher. My dissertation is on the philosophy of probability, and Prof Elga is one of my advisers. This seminar is a good opportunity to develop our working and mentoring relationship. I know I will learn a lot, not just from preparing the material, and from Prof Elga, but from the students themselves and our discussions together.