Philosophy of Probability & Inductive Logic

PHIL 3210
Course # 13628
Fall 2010
MWF
9:40-10:30
OSH 104

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(or by appointment)
http://www.hum.utah.edu/~mhaber/PHIL3210.html

Course Description

The philosophy of probability concerns the nature and application of probability; it is not primarily about the numbers and formulas, but the ideas behind those things. What does an assignment of probability mean? To what kinds of things may probabilities be assigned? Are probabilities discovered, or calculated, or both? How does probability relate to inductive logic: are they identical, or is it a mistake to conflate the two? Ian Hacking has described probability as ‘Janus-faced’, namely that it has two distinct yet related senses. What does Hacking mean? The philosophy of probability touches on these questions and more.

In this class we (1) explore the relationship between inductive logic and probability; (2) evaluate competing interpretations of probability; and (3) develop basic formal skills in probability logic and calculus. Together these will help us develop a solid conceptual understanding both of the nature of probability and its applications, while at the same time serve as a useful lens by which to view more general philosophical problems.

Course Layout

We will be (roughly) alternating on a weekly basis between formal and conceptual treatments of probability. A more detailed description of this can be found below, in “Course Topics,” or on the course website:
http://www.hum.utah.edu/~mhaber/PHIL3210.html.

Class will consist of both lectures and small group discussions. You are expected to attend all classes. If you fail to attend class and miss an assignment, it is your responsibility to get this assignment.

For the formal material, we will be using Ian Hacking’s An Introduction to Probability and Inductive Logic as our textbook. You will be assigned exercises from this text, and can expect exams to contain questions similar in style and difficulty. In addition to the ground covered by Hacking, I will also be developing a treatment of probability as an extension of formal logic, and introduce algebraic and axiomatic proofs of central...
concepts in probability. This will include material drawn from other texts and supplemental homework assignments, which you should also use as study guides for exams.

For the conceptual and historical material, we will be using primary literature, supplemented by Maria Galavotti’s A Philosophical Introduction to Probability. These weeks will begin with small group discussions, which will include the reading of student panel reports (see below). At the beginning of the semester, each student will sign up for two weeks in which they will bring a panel report to class. In all other weeks covering conceptual and historical material, students will be expected to complete peer reviews of their classmates’ work.

I will use the course website to post reading, writing, and other assignments. Some of my lectures may use power point; when possible, I will post note slides of these power point lectures on the course website prior to giving the lecture.

**Texts**

We will be using two textbooks for this course, along with other posted readings.

- Ian Hacking’s An Introduction to Probability and Inductive Logic.
  - Hacking’s text will comprise much of the primary reading for the formal sections of this course, and you will be assigned exercises from many of the chapters as homework. Some of your exam questions will be modeled on these exercises.

- Maria Galavotti’s A Philosophical Introduction to Probability.
  - Galavotti’s text is less formalized than Hacking’s, but offers a more extensive treatment of the competing interpretations of probability. This text will be a very useful secondary source of this material, serving as a complement to the assigned primary literature that will be made available electronically.
  - Relevant class lectures will follow the Galavotti text, which is based on her lecture notes for a similar course as ours.
Course Topics
This course will cover both formal and conceptual/historical material, roughly alternating between the two on a weekly basis:

Week 1: Introduction to Basic Concepts & Problems
• The Problem of Probability; Basic Logical and Probability Terms and Tools; Elementary Rules of Probability; Calculating Probabilities.

Week 2: The Problem of Induction
• Hume’s Skepticism; Inductive Logic; Probability & Induction.

Week 3: The Classical Interpretation
• Laplace; The Principle of Insufficient Reason; Determinism; Problems & Limitations Of The Classical Interpretation.

Week 4: Conditional Probability & the Axioms of Probability
• Calculating Conditional Probability; Probability Tree Calculations; Axioms of Probability.

Week 5: The Logical Interpretation
• Keynes’ and Carnap’s Logical Interpretation; Ramsey’s Criticism.

Week 6: Bayes’ Rule
• Calculating Conditional Probabilities Using Bayes’ Rule.

Week 7: The Subjective Interpretation of Probability
• Ramsey-De Finetti; Probability As Degrees of Belief
• von Mises’ Probability As Limiting Frequency; Difficulties And Limitations Of The Frequency Interpretation.

Week 8: Review of Formal Material
• Exam #1

Week 9: The Frequency Interpretation
• von Mises’ Probability As Limiting Frequency; Difficulties And Limitations Of The Frequency Interpretation.

Week 10: Modeling Logical & Probability Space (1)
• Kolmogorov’s Axioms; Intro to the Probability Calculus; Algebraic Proofs.

Week 11: The Propensity Interpretation
• Popper’s Propensity Interpretation; Difficulties and Limitations of the Propensity View.

Week 12: Modeling Logical & Probability Space (1)
• Conclusion of Probability Calculus; Axiomatic Proofs.

Week 13: Scientific Bayesianism/The New Problem of Induction
• Scientific Bayesianism and Its Critics; Goodman’s ‘grue’ problem.

Week 14: Dutch Book Arguments
• Dutch Book Proofs.

Week 15: Review & Second Formal Exam
Final Exam Week: Final Exam/Final Essay
Course Requirements and Grading

All written material must be submitted via turnitin.com to receive credit, even when brought to class. Missing or late assignments may carry additional penalties on your overall grade calculation (e.g., 1/3 grade reduction, such as 'B+' to 'B') to reflect the importance of the interactive nature of some of these assignments.

Panel Reports

Report 1: 10%; Report 2: 15%

Each student must write a panel report for two of the conceptual/historical topics listed above. Your goal should not be to try and cover lots of ground, but rather to provide (i) context for (ii) a critical analysis of a focused point. In other words, these papers should aim to (i) succinctly summarize one of the course readings for that week, in order to (ii) provide critical discussion of one argument in that reading. Sign-up sheets for panel reports will be handed out on the first day of class.

Panel reports are due the Wednesday prior to being read aloud in class; late papers will be docked points. This will give your classmates time to read the reports and submit their peer commentary (see below).

Panel reports must be brought to class, where they will be read aloud and discussed in small groups. Your first short paper will be read aloud by you to your small group, where it will then be discussed. Second papers will be read aloud by another member of the group. In addition to being an effective writing exercise, the goal of these assignments is to give you practice succinctly articulating a position, and defending or modifying that position in face of criticism. Doing philosophy is not merely about reading, writing, and listening (though those are important!) but also in actively engaging in intellectual discourse.

In addition to reading and defending your panel report to your peers in small groups, be prepared to discuss, explain and defend what you write in front of the entire class. I will be reading passages aloud from a selection of panel reports on Wednesday of each week, followed by direct questioning and discussion with the author of that report. This will provide you with feedback on how to improve your writing and argumentation, and will also facilitate understanding of the material.

You will receive full credit for your first assignment simply by (1) completing it, (2) participating in the relevant small group discussion, and (3) engaging in an instructor-led class reading of your paper. Nonetheless, you will receive comments as well as the grade that you would have received were the paper fully evaluated. This is a risk-free opportunity to receive feedback on your work, and helps pinpoint where you need to improve to get a better grade. On your second panel report, grades will count.

Panel reports should be no more than 5 pages long. It is unlikely you’ll be able to effectively discuss more than one argument in such a short paper, so stay focused!
We are scheduled to cover conceptual/historical material in seven weeks of this semester. Each student will write a panel report for two of those weeks (see above). In the other five weeks, students are expected to submit peer commentaries on the panel reports submitted in their small groups. Commentaries are due before the class in which the peer reports are read aloud by your classmate. Rubrics will be provided for these peer commentaries, which must be completed and submitted via turnitin.com. Credit for these peer reviews is full/partial/none. To receive full credit the entire rubric must be completed, along with thoughtful commentary. Due to the nature of the assignment no late commentaries will be accepted. You may wish to bring your commentaries and/or a printout of your classmates panel report to class to facilitate discussion.

Homework 5%

In weeks covering formal material, you will be assigned problem sets. These will be due at the beginning of class on Friday. You will be responsible for checking your own work. I will simply be checking that you did the homework, assigning full, partial or no credit depending on how much of the homework assignment was completed. If you have a question about particular problems, I am happy to discuss them in class. However, unless prompted I am unlikely to go over any assigned problems—so ask!

Formal Exams 30% (weighted)

There will two exams covering the formal material in this course. The second of these will be administered on the last regular day of class.

Final Essay/Essay Exam 30%

Each student will be given the option of either taking a final exam or writing a final term paper. The essay assignment will be graded along several components, including: (a) submitting a rough draft of your essay for peer review; (b) providing peer reviews of other students’ drafts; and (c) developing a final draft incorporating useful material from the peer reviews of your draft (due on the day of the final exam period). The final exam will also have several components, including a formal section and essay questions. Both the final exam study guide and final essay assignment will be made available early in the semester so you have plenty of time to decide.

(Course assignments are subject to revision in response to class progress, e.g., the second panel report may become a pass/no-pass assignment.)

(Grading criteria is specified in my ‘Grading Rubric’ document, available on the course website.)
Online Components

_turnitin.com_ (http://www.turnitin.com/static/index.html)

All papers must be turned in electronically through turnitin.com. Except by prior arrangement, I will not accept hard copies of any papers, nor will I accept any papers emailed directly to me! You will need to register with the course turnitin.com page. Here is the information you will need to do this:

- class id: 3368913
- class password: dice2010

_PHIL 3210 Course Website_ (http://www.hum.utah.edu/~mhaber/PHIL3210.html)

This site contains a weekly topic & reading list. You may download course readings and homework assignments as they become available.

Administrative and Campus Policies

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 Union Building, 581-5020 (V/TDD). CDS will work with you and the instructor to make arrangements for accommodations.

I have zero tolerance for plagiarism and cheating. Students are responsible for knowing and understanding the University's policy on academic misconduct. More information may be found in the Student Code, available at http://www.admin.utah.edu/ppmanual/8/8-10.html#SECTION%20V. According to the Code of Student Rights and Responsibilities, "Plagiarism includes, but is not limited to, representing as one's own, without attribution, any other person's words, phrasing, ideas, sequence of ideas, information or any other mode or content of expression. It does not include honest error." You are welcome to cite sources in your work, but you must do so explicitly and clearly. Please contact me if you have any questions on how to appropriately credit and mark the work of others.