Philosophy 341: Philosophy of Science
Fall 2022

Course Information

Time: MW 10:00A–11:15A
Instructor Name: Ge Fang
Email: gfang1@iit.edu
Instructor office: Siegel Hall 235
Office Hours: W 3:30P–5:30P or by appointments
Classroom: Siegel Hall 204

Course Description

This course introduces students to the central concerns in general philosophy of science: What is science? What is the scientific method? What is the relation between science and value? We will critically examine the common answers to these questions: that the science is the search for truths, that scientific activities are characterized by a systematic and distinctive method, and that science is value-free. The primary goal of this course is to get students acquainted with the development and structure of philosophy issues surrounding modern science, which are relatively young in the history of philosophy, and the interaction between these new issues to more traditional philosophical ideas in metaphysics, epistemology, and value theories. Along the way, the students are trained to develop philosophical skills in

- Judging whether common claims about science are philosophically controversial .
- Identifying theses and define key terms from philosophical articles.
- Reconstructing important arguments from readings in a charitable way.
- Evaluating arguments written by other authors.
- Constructing valid arguments to support or counter a thesis.
- Writing clear academic essays to communicate philosophical arguments.

Grading

Eight quizzes: 20% in total. These are surprise quizzes; the dates for the quizzes are not announced beforehand. Each quiz will comprise four multiple-choice or true/false questions about the day's required reading. You will get 2 points for writing your first and last name on the quiz, and 0.5 point for each correct answer. The final score will be based on the 5 highest scores out of 8. There will be no makeup quizzes.

Paper (60%):

- Research proposal (5%). After the lectures of eighth weeks, you will be asked to come up with a research question for your final paper. I will share tips on how to select a research question. The research question will be due at the end of week 7 (Oct. 7).

- Essay outline (5%). After the lectures of the tenth week, you need to come up with a valid plan to support one answer for the selected research question. This will be due at the start of the week 10 (Oct. 24).
- Outline partial elaboration (5%). Elaborate one central point you made in the outline into 3 pages. This should be submitted by the end of week 11 (Nov. 4).
- Peer review (5%). Write comments for one of your classmates' part of essay. This should be submitted by the end of week 12 (Nov. 11)
- In class presentation (10%). In the last 2 weeks, you will be asked to present in class about your project for 5 minutes.
- Final paper (30%). The length of the final paper should be between 8 to 10 pages in length, double-spaced, with one-inch margins and a standard 12-point font. The final paper is due on May 6.

Weekly assignments: 20% in total. These are mini tasks designed to develop one's skills in philosophical analysis. These assignments will be published weekly only in the first half of the semester. In the second half, students will use the developed skills to craft the final paper. Exercises include identifying keyword, finding the location for keyword definition, paraphrasing definition, brainstorming illustrative examples, locating the thesis for paper, paraphrasing the thesis, finding supporting reasons for the thesis, finding undermining reasons for thesis, etc. Instructions to these tasks will be published on the blackboard at least a week before its due.

Discretionary bonus and penalty points: Students who contribute regularly to class discussions will get one grade higher (B to A, C to B, etc..). Students who disrupt the learning environment will lose points. Causes of disruption include arriving late or departing early, leaving the room during class without a medical emergency, **having a computer or other electronic device on during the class**, having a cellular phone or other electronic device beep or ring during class, or otherwise engaging in activities other than attending to class during class.

Attendance: I understand that students sometimes have very good reasons to miss class: religious obligations, illness, a commitment to family or teammates. I will not excuse some absences and not others, and we have designed our procedures to make it possible to score a strong participation even if one falls ill or has multiple religious obligations. I simply ask that you make your decisions as you think wise, and live with the consequences.

Required Text

Almost all readings can be found in Curd, Cover & Pincock's *Philosophy of Science: The Central Issues*, 2nd edition, Norton (CC below) and in Helen Longino's *The Fate of Knowledge*, Princeton University Press. Physical copies are required so that you can refer to the text during lectures. Other required readings will be uploaded to Blackboard (BB below). You will need to download and print these. (Since electronic devices are not permitted in the classroom, you need to print these readings out to be able to refer to them in class. If you want to save paper by printing out just one copy that you will share with your neighbor in class, you may arrange to do this. If you want to study the essay on the screen and then print out the paper in small format, two or more pages to each sheet of paper, you may do that.)

Course Schedule

Topic 1: Varieties of epistemic goods in science: Representations of empirical regularities, Theories/theoretical concepts, Prediction, Manipulationist Models/Mechanisms, and Historical Narratives

8/22 M: Introduction.
Godfrey-Smith "Theory and Reality, Chapter 1"

8/24 W: Representations of empirical regularities: Logical empiricsm.
Godfrey-Smith "Theory and Reality, Chapter 2,"

8/29 M: Theoretical instruments (or truths)? Constructive empiricism vs scientific realism.
Van Frassen: "Arguments Concerning Scientific Realism,"
Recommended reading (Perspectives from the realists):
Godfrey-Smith "Theory and Reality, Chapter 12"
Hempel "The Theorectian's Dilemma"

8/31 W: Conceptual schema: history of science
Kuhn, "The Nature and Necessity of Scientific Revolutions"

9/5 M: Labor day. No class.

9/7 W: Historical narratives:
Currie 2013, "Narratives, mechanisms and progress in historical sciences"

Topic 2: Problem of Induction

9/12 M: Introducing the problem:
Lipton, "Induction" (CC 390)

9/14 W: The difficulty of this problem
Godfrey-Smith "Theory and Reality, Chapter 3,"

9/19 M: Avoiding the problem?
Popper, "The Problem of Induction" (CC 406); Salmon, "Rational Prediction"

9/21 W: Bayesianism
Salmon, "Rationality and Objectivity in Science or Tom Knhn Meets Tom Bayes"

Topic 3: The decaying trace and underdetermination

9/26 M: Introducing the problem
Sober 1988 "Reconstructing the Past", Chapter 1, CC 333–358;

9/28 W: The present overdetermines the past
Cleland 2002, "Methodogical and epistemic differences between historical science and experimental science"

10/3 M: The present underdetermines the past
Turner 2005, "Local Underdetermination in Historical Science"

10/5 W: Both, the ripple model
Currie 2018, Rock, Bones, and Ruin, chapter 5

Research Proposal due on 10/7, 23:59pm (Fri)

10/10 M: Fall break day. No class.

Topic 4: Uncertainty

10/12 W: Introducing the problem
Elloit 2017, A Tapestry of Values, Chapter 5

10/17 M: Inductive Risk
Douglas 2000, "Inductive Risk and Values in Science"

Topic 5: Personal biases and social diversity

10/19 W: Introducing the problem
Godfrey-Smith "Theory and Reality, Chapter 8"

10/24 M: Rejecting the dichotomy of rational/social
Longino, "The Fate of Knowledge, chapter 4"

Essay outline due on 10/24, 23:59pm (Mon)

10/26 W: Beneficial social norms for knowledge production
Longino, "The Fate of Knowledge, chapter 6"

10/31 M: Further Discussion
Kitcher "The Third Way", Longino, "Reply to Philip Kitcher"

Topic 6: Causation, and Inter-theoretic relations

11/2 W: Explanation and Prediction: The covering law model of explanation.
Hempel, "Two Basic Types of Scientific Explanation" & "The Thesis of Structural identity" (CC 657, 667)

Partial elaboration due on 11/4, 23:59pm (Fri)

11/7 M: Probabilistic Explanation: Token
Salmon, "Probabilistic Causation"

11/9 W: Probabilistic Explanation and causal Law
Cartwright, "Causal Laws and Effective Strategies"

Peer review due on 11/11, 23:59pm (Fri)

11/14 M: Manipulationist models: The interventionist view of causal explanation.
Woodward and Hitchcock, "Explanatory Generalizations, Part I"

11/16 W: Mechanisms
Machamer, Darden, and Craver, 2000, "Thinking about Mechanisms"

Topic 6: Scientific Education

11/21 M: TBD

11/23 W: Thanksgiving. No class.

11/28 M: Presentations

11/30 W: Presentations

Final Paper due on 12/2, 23:59pm (Fri)

12/5-10: Exam week. No Exam for this course.

Academic Honesty

Students are bound by the IIT policy on academic integrity in all aspects of this course. One of the most common violations of academic integrity is plagiarism. Plagiarism includes, but is not limited to, copying someone else's exact words, paraphrasing their sentences, or summarizing their thoughts or ideas, without giving credit to the original author. Here is a web resource on when to cite:
http://tigger.uic.edu/~edelberg/crediting_others/index.htm

Disability

Students with disabilities may request accommodations to ensure equal access and equal academic opportunities. Requests for accommodation are coordinated through Center for Disability Resources. The Center for Disability Resources is located in Suite 3F3-1, 10 W 35th St. You can also call them at 312-567-5744 or email them at disabilities@iit.edu. Should accessibility issues arise, be sure to reach out to your instructor about your Accommodation Plan.