

# Philosophy of Science

Monday and Wednesday, 9:50–12:15

Teaching Building 6, Room 308 (on Monday)

and Teaching Building 6, Room 307 (on Wednesday)

Peter Finocchiaro

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## Course Description:

Neil deGrasse Tyson has said that philosophers are not “productive contributor[s] to our understanding of the natural world.” Stephen Hawking has said that “philosophy is dead,” because “[p]hilosophers have not kept up with modern developments in science.” And Lawrence Krauss has even said that “. . . the worst part of philosophy is the philosophy of science. . . [i]t has no impact on physics what so ever, and I doubt that other philosophers read it.”

Harsh words from three of the most popular physicists today! But are they right? Our central goal in this class is to find out. We will seek to understand how – if at all – philosophy is relevant to scientific practice. We will do so in two ways. First, we will explore some “classic” debates in the philosophy of science concerning the foundational epistemology, metaphysics, and ethics of science. Second, we will explore some “new” debates that focus on more specific topics within the philosophy of science. Such topics include: the ontology of quantum mechanics, the neuroscientific study of moral responsibility, and the “scientific creation” of sexuality.

**Required Texts:** *Philosophy of Science: A Contemporary Introduction* (Second Edition), by Alex Rosenberg; *Philosophy of Science: Contemporary Readings*, edited by Alex Rosenberg and Yuri Balashov

I will provide pdf files of all course material, including the text mentioned above.

**Optional Texts:** In addition to the above required material, students may also consider acquiring the following supplementary material:

- *Philosophy of Natural Science*, by Carl Hempel
- *Philosophy of Social Science* (Third Edition), by Alex Rosenberg
- *The Structure of Scientific Revolutions* (Third Edition), by Thomas Kuhn

I don’t plan to explicitly discuss the first two texts in class. But they can serve as useful background for our class discussions. (I can also provide pdf files of these texts upon request.)

**A note about the reading:** For each class session, I will come prepared to discuss specific aspects of the reading assigned for that day. That being said, in each class session we are free to explore whatever issues come to mind. Every student should, therefore, read *all* of the assigned material.

**Letter Grade Distribution:** In this course I will use the following scale to convert between numerical and letter grades:

|                |    |               |    |
|----------------|----|---------------|----|
| 96.00 - 100.00 | A+ | 70.00 - 74.99 | B- |
| 90.00 - 95.99  | A  | 67.00 - 69.99 | C+ |
| 85.00 - 89.99  | A- | 63.00 - 66.99 | C  |
| 80.00 - 84.99  | B+ | 60.00 - 62.99 | C- |
| 75.00 - 79.99  | B  | 00.00 - 59.99 | D  |

**Grade Distribution:** The overall grade is determined by the following:

|               |     |
|---------------|-----|
| Participation | 20% |
| Quizzes       | 10% |
| Midterm       | 30% |
| Paper         | 40% |

### Course Goals:

As I said above, our central goal is to determine how philosophy is relevant to scientific practice. In service to that goal, I offer the following three smaller goals:

- (a) to gain familiarity with “classic” debates in the philosophy of science, including the motivations for the debates, the prominent positions taken in those debates, and the arguments for or against those positions;
- (b) to explore the areas where contemporary science and philosophy intersect, and the ways in which they attempt to address one another;
- (c) to improve our ability to articulate why we think the above points are relevant to scientific practice (or why we think they are not)

## Assignments

**Participation:** Philosophy is an activity that we do, and active participation in philosophy is the best way to learn to do philosophy. Each student is expected to interact with me and with other students inside and outside of class. It’s important to note, though, that active participation is more than just being vocal; it requires carefully thinking through issues and engaging with peers, often by listening to, supporting, clarifying, or justifying their comments. Doing philosophy is not just about expressing your own ideas, but is just as much about engaging with the ideas of others. Metaphorically speaking,

the ideal philosophical discussion is less like a game of ping pong and more like a soccer (“football”) match. Each student will be graded on the extent to which they follow this model of active participation.

**Quizzes:** Every Wednesday during weeks 2–7, students will answer a short quiz question regarding the material from that Monday. These questions will ask students to reconstruct an influential idea and evaluate it. Afterwards, I will grade the answers on a “ ✓- / ✓ / ✓+ ” scale.

These quizzes are intended to be a low-stakes opportunity for students to cultivate their ability to communicate ideas through writing. This ability will be important for both the midterm and the term paper.

**Midterm:** After we finish reading through Rosenberg’s introductory text, students will complete a take-home midterm exam. The exam will consist of a series of essay questions. These questions will be like the quiz questions, but more complex. Because the exam is take-home, students can consult their notes and the reading material. Students *can* study together before the exam, **but students must work on their exams separately.**

**Paper:** Each student will write one paper for this course. This paper should be argumentative in style and attempt to show a significant connection between philosophy and science. Such a paper might, for example, defend the “theory-laden” thesis about scientific observations. Students may choose their own topic or they may choose to have a topic assigned by me. **No matter what topic students write on, they must first get my approval through an email or a face-to-face meeting.**

## Reading List and Schedule:

Below is a tentative schedule of the material that we will cover throughout the semester.

### Acronyms:

- “RI” = *Philosophy of Science: A Contemporary Introduction* (Second Edition), by Alex Rosenberg
- “BRR” = *Philosophy of Science: Contemporary Readings*, edited by Yuri Balashov and Alex Rosenberg

### Unit 1: Introduction to the Philosophy of Science

**Day 1:** Introductions (no reading)

**Day 2:** Chapter 1 (RI: 1–18)

**Day 3:** Chapter 2 (RI: 21–45)

**Day 4:** Bas van Fraassen’s “The Pragmatics of Explanation” (BRR: 56–70)

**Day 5:** Chapter 3 (RI: 48–67)

**Day 6:** John Earman and John Roberts’s “‘Ceteris Paribus’, There Is No Problem of Provisos” (*Synthese* 118: 439–478)

**Day 7:** Chapter 4 (RI: 69–109)

**Day 8:** Gary Gutting’s “Scientific Realism versus Constructive Empiricism: A Dialogue” (BRR: 234–247)

**Day 9:** Chapter 5 (RI: 112–142)

**Day 10:** Peter Achinstein’s “The Grue Paradox” (BRR: 307–320)

**Day 11:** Chapter 6 (RI: 145–168)

**Day 12:** Thomas Kuhn’s “Objectivity, Value Judgment, and Theory Choice” (BRR: 421–437)

**Day 13:** Chapter 7 (RI: 170–192)

**Day 14:** Elizabeth Anderson’s “Feminist Epistemology: An Interpretation and a Defense” (BRR: 459–485)

## **Unit 2:** Topics in the Philosophy of Science

**Day 15:** Tim Maudlin’s “On the Unification of Physics” (*Journal of Philosophy* 93: 129–144)

**Day 16:** Guest lecture on quantum mechanics by Juha Saatsi (University of Leeds)

**Day 17:** Exerpts from Richard Dawkin’s *The Selfish Gene* (Chapter 11: Memes, the New Replicators)

**Day 18:** Sharon Street’s “A Darwinian Dilemma for Realist Theories of Value” (*Philosophical Studies* 127: 109–166)

**Day 19:** Colin Klein’s “The Brain at Rest: What It Is Doing and Why That Matters” (*Philosophy of Science* 81: 974–985)

**Day 20:** Adina L. Roskies’s “How Does the Neuroscience of Decision Making Bear on Our Understanding of Moral Responsibility and Free Will?” (*Current Opinion in Neurobiology* 22: 1022–1026)

**Day 21:** Exerpts from Brian Epstein’s *The Ant Trap: Rebuilding the Foundations of the Social Sciences* (Chapter 1: Individualism, a Recepte for Warding off “Spirits”)

**Day 22:** Exerpts from Daniel M. Mausman and Michael S. McPherson's *Economic Analysis, Moral Philosophy, and Public Policy* (Chapter 2: Ethics in Welfare Economics: Two Examples)

**Day 23:** Exerpts from Edward Stein's *The Mismeasure of Desire* (Chapter 4: Essentialism and Constructionism about Sexual Orientation)

**Day 24:** Janet Kourany's "Should Some Knowledge Be Forbidden? The Case of Cognitive Differences Research" (*Philosophy of Science* 83: 779–790)