

**PHIL 221: Philosophy of Science
Syllabus, Fall 2019**

1. Instructor Information

Name: Aaron Novick

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Office: BRNG 7133

Office Hours: MW 2:30-3:30pm, and by appointment

Pronouns: he/him/his

2. Course Time and Location

Time: 1:30-2:20pm, MWF

Location: BRNG 1230

3. Course Description and Objectives

The knowledge produced by the sciences ranks among humankind's greatest achievements. In this course, we will examine these achievements in order to better understand what science is and how it works. We will consider questions such as: What are scientific theories, and how are they discovered and justified? How does scientific knowledge change over time? What distinguishes good science from bad science? What distinguishes science from pseudoscience? What role, if any, should value judgments play in science? How are the various different sciences related? How should science inform policy? Students who take this course will be exposed to a variety of views on each of these topics, and will be trained to evaluate them and to develop and defend their own views. Students will leave the course prepared to engage with science both as citizens of a science-dominated world and, where relevant, as scientists themselves.

4. Course texts

- **(required)** Gillian Barker and Philip Kitcher, *Philosophy of Science: A New Introduction* (Oxford University Press)
- **(required)** Thomas Kuhn, *The Structure of Scientific Revolutions: 50th Anniversary Edition* (University of Chicago Press)
- **(optional)** Steven Shapin, *The Scientific Revolution*, 2nd edition (University of Chicago Press)

Any required reading beyond the two required texts will be made available online. We will not use the Shapin volume in the course; however, it is a very interesting book that nicely complements the course themes. On the reading schedule, I will indicate when particular chapters are appropriate to read.

5. Course requirements and grading

Weekly journals (18 points). Most weeks, you will be asked to briefly (<1 page) reflect on the readings and discussions from the previous week. More detailed instructions will be given on individual assignments. Each individual journal will be worth two points, and will be primarily graded for completion.

Reading responses (24 points). For various readings, you will be asked to complete a short assignment that will be due at the beginning of class and will be the basis for in-class activities/discussion. Each individual response will be worth three points, and will be graded for content.

Unit exams (36 points). The course is split into three main units. At the end of each unit, there will be a non-cumulative exam worth 12 points. Before each exam, there will be a review session, which will be based on your questions, so come prepared.

Final paper (22 points). Instead of a final exam, there will be a final paper. I will provide a list of topics; you may also write on a topic of your choosing, but you must get my approval first. Topics and a rubric will be distributed later in the course. A portion of your paper grade will be based on an outline (due December 4), on which you will receive feedback that you can use as you complete the final paper. Detailed instructions for the outline will be provided later.

Participation and attendance (0 points). I will not be grading attendance or participation in this course, and I would like to explain why. **Attendance.** In order to succeed in this course, you will need to attend most of the class sessions. The texts we will read are difficult and easy to misinterpret without guidance, and online resources for self-teaching are of highly variable quality. At the same time, I recognize that you have lives beyond this course that may force you to miss class on occasion. If you must miss class, I encourage you to get notes from a fellow student, review them, and then come to office hours with questions. **Participation.** Participation grades are easily subject to bias and favor students who are comfortable speaking in class over others; for this reason, I prefer not to give them. I nonetheless expect you to come to class having done the readings and prepared to discuss them.

Note: Both of these policies are experiments, and I reserve the right to change them mid-semester if necessary.

Grading Scale.	A+: 98-100	A: 93-97	A-: 90-92
	B+: 88-89	B: 83-87	B-: 80-82
	C+: 78-79	C: 73-77	C-: 70-72
	D: 60-69	F: <60	

6. Course policies

Disability and accommodation policy. It is my intention that this course be made accessible to all students, and not pose an undue burden. This means, minimally, that I will grant any accommodations required by the Disability Resource Center. But I am also aware that, for any number of reasons, you may require accommodations that are not formally certified by that office. If some aspect of the class poses a hardship for you, I encourage you to talk to me, and we can work together to develop an alternative way for you fulfill the course requirements.

Purdue Honors Pledge. As a boilermaker pursuing academic excellence, I pledge to be honest and true in all that I do. Accountable together -we are Purdue.

Academic Integrity. Academic integrity is one of the highest values that Purdue University holds. Individuals are encouraged to alert university officials to potential breeches of this value by either emailing integrity@purdue.edu or by calling 765-494-8778. While information may be submitted anonymously, the more information that is submitted provides the greatest opportunity for the university to investigate the concern.

Plagiarism. [Purdue University policy](#) defines plagiarism as “intentionally or knowingly representing the words or ideas of another as one’s own in any academic exercise.” In this course, you will be asked to complete assignments in which you articulate your own thoughts in your own words. As part of these assignments, you will be asked to engage with (including summarizing) the ideas of those we have read, as well as work you find on your own. It is imperative, in completing these assignments, that you cite any sources you use. Failure to do so is a serious offense, and will result, at minimum, in receiving a zero score on the relevant assignment, as well as being reported to the university. Serious cases will result in failing the entire course. Here are some ground rules for what I expect:

- If you use *the exact words* of another author, you must put the quoted passage inside quotation marks, name the author and give the page number of the quote in the main text, and include a bibliography containing the full reference.
- If you *summarize or paraphrase* the point of another author, you must name the author and give the page number of the summarized passage in the main text, and include a bibliography containing the full reference.
- If you *cite a fact or statistic* that you found in a source, you must cite that source in the main text and in the bibliography. The *only exception* is if the fact is common knowledge. Here is an example of common knowledge: “dogs have four legs.” Anything more obscure than that requires a citation. *If you are uncertain, always err on the side of including a citation.*

Commercial websites. Material distributed in this class (assignments, exams, etc.) may ***NOT*** be sold to commercial websites (e.g., Chegg, Course Hero, and Quizlet). This prohibition includes course notes, which are considered “derivative works” of the instructor’s materials. You are permitted to distribute notes to other individuals (e.g., a friend who missed class) in a private capacity.

In-class etiquette. Philosophy is a social endeavor. People engaged in philosophy do not simply think in solitude, but rather engage in discussion with others. That will be true in this class as well: you will be encouraged to discuss the topics we cover with your fellow students. You are even encouraged to disagree with them. It is therefore imperative that you understand how to do so respectfully. Here are some ground rules:

- Think of those with whom you disagree not as opponents but as fellow seekers of the truth. Even if you disagree, you are *collaborating*.
- Acknowledge the person you are responding to, by name if possible.
- Address your comments to the arguments that have been offered. Never attack the intelligence or character of the person who argued for them.
- On some issues, you may have strongly held opinions. That is ok, but it is important to recognize that people who disagree with you are doing so in *good faith*. Before getting angry with or dismissive of another person, try to understand why they think the way they do.

7. Reading schedule

See next page.

7. Reading Schedule

Date	Topic	Reading (due on date listed)	Assignments (due on date listed)
Aug 19	Introduction	<i>no required reading</i>	<i>no assignments</i>
Aug 21	Two old sciences	Democritus Darwin, <i>Origin of Species</i>	Reading response: two sciences
Aug 23	What is science? A brief history	Barker + Kitcher ch. 1 Shapin ch. 1 (<i>optional</i>)	<i>no assignments</i>
Unit 1: The Analytic Project and Classical Philosophy of Science			
Aug 26	The analytic project	Barker + Kitcher, 12-24	Weekly journal
Aug 28	Confirmation	Barker + Kitcher, 24-34	<i>no assignments</i>
Aug 30	Falsification	Popper, "Conjectures and Refutations"	<i>no assignments</i>
Sep 2	<i>NO CLASS – LABOR DAY</i>		
Sep 4	The Duhem-Quine problem	Duhem, <i>The Aim and Structure of Physical Science</i> (excerpt)	Weekly journal
Sep 6	Lakatos on research programmes	Lakatos, "Science and Pseudoscience" Barker + Kitcher, 34-38	Reading response: Lakatos and Popper
Sep 9	Explanation (1)	Barker + Kitcher, 38-46	Weekly journal
Sep 11	Explanation (2)	Reutlinger, "Explanation Beyond Causation"	<i>no assignments</i>

Date	Topic	Reading (due on date listed)	Assignments (due on date listed)
Sep 13	Explanation (3)	Darwin, <i>Origin of Species</i>	<i>no assignments</i>
Sep 16	The unity and disunity of science	Barker + Kitcher, 50-61	Reading response: Darwin
Sep 18	Causation	Barker + Kitcher, 61-66	<i>no assignments</i>
Sep 20	<i>NO CLASS - INSTRUCTOR OUT OF TOWN</i>		
Sep 23	Methodological naturalism	Barker + Kitcher, 66-77	Weekly journal
Sep 25	Exam review	<i>no readings</i>	<i>no assignments</i>
Sep 27	EXAM: UNIT 1		
UNIT 2: The Kuhnian Revolution in Philosophy of Science			
Sep 30	Introduction to Kuhn	Kuhn, ch. 1	<i>no assignments</i>
Oct 2	Kuhn (1): Normal science	Kuhn, chs. 3-4 Kuhn, ch. 2 (<i>optional</i>)	Reading response: normal science
Oct 4	Kuhn (2): Anomaly and discovery	Kuhn, ch. 6 Kuhn, ch. 5 (<i>optional</i>)	<i>no assignments</i>
Oct 7	Kuhn (3): Crisis	Kuhn, ch. 8 Kuhn, ch. 7 (<i>optional</i>)	Weekly journal

Date	Topic	Reading (due on date listed)	Assignments (due on date listed)
Oct 9	<i>NO CLASS – FALL BREAK</i>		
Oct 11	Kuhn (4): Revolution I	Kuhn, ch. 9	<i>no assignments</i>
Oct 14	Kuhn (5): Revolution II	Kuhn, ch. 10 Kuhn, ch. 11 (<i>optional</i>)	Reading response: world changes
Oct 16	Kuhn (6): Scien- tific progress	Kuhn, ch. 13 Kuhn, ch. 12 (<i>optional</i>)	<i>no assignments</i>
Oct 18	Kuhn’s legacy	Barker + Kitcher, 78-95	<i>no assignments</i>
Oct 21	Realism and anti-realism	Barker + Kitcher, 94-105	Weekly journal
Oct 23	Exam review	<i>no readings</i>	<i>no assignments</i>
Oct 25	EXAM: UNIT 1		
UNIT 3: Science and Society			
Oct 28	Situated science	Barker + Kitcher 106-125	<i>no assignments</i>
Oct 30	The value-free ideal	Bright, “Du Bois’ democratic de- fence of the value-free ideal”	<i>no assignments</i>
Nov 1	Bias and science	Okruhlik, “Gender and the Bio- logical Sciences”	Reading response: value-free sci- ence

Date	Topic	Reading (due on date listed)	Assignments (due on date listed)
Nov 4	Consensus and dissensus	Barker + Kitcher 125-135	Weekly journal
Nov 6	Diversity and Objectivity	Longino, "Values and Objectivity"	<i>no assignments</i>
Nov 8	The autonomy of the sciences	Barker + Kitcher, 136-150	<i>no assignments</i>
Nov 11	What do we want to know?	Barker + Kitcher, 150-163	Weekly journal
Nov 13	Pseudoscience	Gordin, <i>The Pseudoscience Wars</i>	Reading response: pseudoscience
Nov 15	Case study: climate science I	Lloyd, "The role of "complex" empiricism in the debates about satellite data and climate models"	<i>no assignments</i>
Nov 18	Case study: climate science II	Oreskes, "The Scientific Consen- sus on Climate Change"	Weekly journal
Nov 20	Case study: climate science III	van der Sluijs et al., "Anchoring Devices in Science for Policy"	Reading response: climate science
Nov 22	Exam Review	<i>no reading</i>	<i>no assignments</i>
Nov 25	EXAM: UNIT 3		
Nov 27	NO CLASS - THANKSGIVING BREAK		
Nov 29			

Date	Topic	Reading (due on date listed)	Assignments (due on date listed)
UNIT 4: Special Topics (mini-unit)			
Dec 2	Biology	Gilbert et al., "A Symbiotic View of Life"	<i>no assignments</i>
Dec 4	Computer Science	Burrell, "How the Machine 'Thinks'"	Paper outline due
Dec 6	Physics	TBD	<i>no assignments</i>
TBD	FINAL PAPERS DUE - NO FINAL EXAM		