

Philosophy of Science (PHIL 4614/5614)

Professor: Karen Kovaka

Fall 2020

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Office Hours: Tues 3:30-5:30pm

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Class Hours: Mon/Wed 4-5:15pm

Class Room: N/A, online

Course Description

Science is central to what we think we know, how we make decisions, and how we understand ourselves. But what makes the difference between what is scientific and what is not? Why is science such a powerful way to gain knowledge? How much should we trust the results of scientific research? Is it ever rational for non-experts to be skeptical about the claims scientists make? We will explore these questions by focusing on four aspects of scientific investigation: the methods scientists use, the behavior of scientists, the place of values in science, and the results of scientific inquiry.

Course Structure

This is an online course with a live (synchronous) class meeting once per week, on Wednesday afternoons from 4-5:15 pm. You will have asynchronous content to work through on your own prior to our Wednesday meeting. Together, the asynchronous and synchronous content form 5 layers. Engaging with each layer makes up your coursework for the week.

- Layer 1: Reading the texts.
- Layer 2: Reviewing my detailed notes on the texts.
- Layer 3: Listening to a conversation between me and an expert guest about the texts.
- Layer 4: Actively participating in our Zoom discussion each Wednesday.
- Layer 5: Keeping an intellectual journal about what you are learning.

You will complete Layers 1-3 before our Wednesday meetings. You have until Friday afternoon each week to complete Layer 5.

Evaluation

1. Homework: 50% (5 assignments, each 10%)
2. Midterm exam: 15%
3. Final exam: 20%
4. Journal: 15%

Homework

I will ask you to complete 5 homework assignments. They will vary in format. Some assignments involve philosophical analysis, while others require you to explain philosophical ideas to other people. There will also be a personal reflection exercise and a short quantitative reasoning problem set. I will walk you through each assignment before it is due so that you know exactly what to expect. Submit these through our Canvas site. The due dates for the assignments are below:

- Assignment 1: 9/4
- Assignment 2: 10/2
- Assignment 3: 10/23
- Assignment 4: 11/13
- Assignment 5: 12/4

Exams

The mid-term will be a short answer, take-home style exam. It will be assigned on 10/8 and due on 10/15. The final will also be a take-home, and I will let undergraduates choose one of several possible exam formats. The final exam will be available on or before the last day of class (12/9) and due on 12/14. Graduate students are required to write an 8-10 page paper for the final exam. They must consult with me about their topic ahead of time.

Journal

Every Friday by 5pm, you will complete and submit a journal entry via our Canvas site. By the end of the semester, you'll have a record of which ideas you found interesting, challenging, tedious, or incomprehensible, as well as a sense of how your own views about science and philosophy have developed over time. I will provide open-ended prompts to guide you, and I'm looking for about one page per week. You are, of course, welcome to add as much additional content as you like. I will grade the journal entries based on completion.

Fine Print

- **Attendance:** I expect you to come to every single live class session except when illness or other personal circumstances prevent you. Your camera should be on for the entire class session, and you should be prepared to contribute to the discussion by sharing your own thoughts, answering my questions, and responding to your classmates' observations. I will keep track of attendance each week and forgive 2 absences with no questions asked. After 2 absences, I will deduct points from your final grade for each additional absence. If your circumstances require you to miss more than 2 classes, you and I need to speak in person about alternative ways for you to participate in the course.
- **Accessibility:** We all learn differently, and I am committed to making this course accessible to everyone. Please come talk to me if some aspect of the course isn't working for you: we can collaborate on alternatives that suit your needs, interests, and learning style. If you have a disability (or think you might), it's also a good idea to contact [Services for Students with Disabilities](#).
- **Technology:** Our phones, tablets, and laptops are crucial tools for online learning, yet they can also distract us during a live class. I want to free you from these distractions as much as possible. For that reason, I am providing notes on all the texts I ask you to read, which means you do not have to take notes during our live sessions. In return, I ask that during our 75 minutes of live time each week, you do not check your email, message people, or use the Internet for anything that isn't course-related.
- **Academic integrity:** I take academic integrity very seriously. It's important that all the assignments you complete are your own work and that you know how to credit and cite sources appropriately. If you have any questions about my expectations for a particular assignment, be sure to talk to me!

The Undergraduate Honor Code pledge that each member of the university community agrees to abide by states: "As a Hokie, I will conduct myself with honor and integrity at all times. I will not lie, cheat, or steal, nor will I accept the actions of those who do." Students enrolled in this course are responsible for abiding by the Honor Code. A student who has doubts about how the Honor Code applies to any assignment is responsible for obtaining specific guidance from the course instructor before submitting the assignment for evaluation. Ignorance of the rules does not exclude any member of the University community from the requirements and expectations of the Honor Code. For additional information about the Honor Code, please visit: <https://www.honorsystem.vt.edu/>.

- **Changes to the syllabus:** I may adjust the course readings and schedule as the semester goes along. It is your responsibility to pay attention to Canvas and your email so that you are aware of any changes.

Texts

There are no required books for this course. All of the texts I assign are available on our Canvas site.

Reading Schedule

1 Introduction

Date	Content
Week 1 8/24 & 8/26	<ul style="list-style-type: none"> • Topic: Getting Philosophical About Science • Watch: <i>Behind the Curve</i>, available on Netflix • Read: Karl Popper (1963), <i>Conjectures and Refutations</i>, excerpts from ch 1 • Live discussion Wed. 8/26 (meeting link and login on Canvas)

2 Scientific Methods

Date	Content
Week 2 8/31 & 9/2	<ul style="list-style-type: none"> • Topics: Diversity of the Sciences & Experiments • Read: Wendy Freedman (2004), "The Hubble constant and the expanding universe" • Read: Felix Warneken and Michael Tomasello (2009), "Varieties of altruism in children and chimpanzees" • Read: Ian Hacking (1983), <i>Representing and Intervening</i>, ch 9 • Listen: Conversation with Prof. Adrian Currie, University of Exeter • Live discussion Wed. 9/2 (meeting link and login on Canvas)
Week 3 9/9	<ul style="list-style-type: none"> • Topic: Models • Reading: Angela Potochnik, Matteo Colombo, and Cory Wright (2019), <i>Recipes for Science</i>, ch 3 • Listen: Conversation with Prof. Michael Weisberg, University of Pennsylvania • Live discussion Wed. 9/9 (meeting link and login on Canvas)
Week 4 9/14 & 9/16	<ul style="list-style-type: none"> • Topics: Comparing Methods & Induction • Read: Emily Parke (2014), "Experiments, simulations, and epistemic privilege" • Read: Hume (1738), <i>A Treatise of Human Nature</i>, 1.3.12 • Listen: Conversation with Prof. Emily Parke, University of Auckland • Live discussion Wed. 9/16 (meeting link and login on Canvas)
Week 5 9/21 & 9/23	<ul style="list-style-type: none"> • Topic: Confirmation Theory • Read: Nelson Goodman (1979), <i>Fact, Fiction, and Forecast</i>, ch 3 • Read: Michael Strevens (2017) "Notes on Bayesian Confirmation Theory," ch 1-5 • Listen: Conversation with Prof. Hayley Clatterbuck, University of Wisconsin-Madison • Live discussion Wed. 9/23 (meeting link and login on Canvas)

3 Behavior of Scientists

Date	Content
Week 6 9/28 & 9/30	<ul style="list-style-type: none"> • Topic: Scientists as Characters • Read: Daniel Kehlmann, <i>Measuring the World</i> • Listen: Expert guest conversation with TBD • Live discussion Wed. 9/30 (meeting link and login on Canvas)
Week 7 10/5 & 10/7	<ul style="list-style-type: none"> • Topic: Normal and Revolutionary Science • Read: Thomas Kuhn, <i>The Structure of Scientific Revolutions</i>, ch 2, 3, & 9 • Listen: Expert guest conversation with TBD • Live discussion Wed. 10/7 (meeting link and login on Canvas)
Week 8 10/12 & 10/14	<ul style="list-style-type: none"> • Topic: Social Structure of Science I • Read: Philip Kitcher (1990), "The division of cognitive labor" • Read: James Owen Weatherall, Cailin O'Connor, and Justin Bruner (2018), "How to beat science and influence people" • Listen: Conversation with Prof. Cailin O'Connor, University of California-Irvine • Live discussion Wed. 10/14 (meeting link and login on Canvas)
Week 9 10/19 & 10/21	<ul style="list-style-type: none"> • Topic: Sociology and Social Structure II • Read: Miriam Solomon (1994), "Social empiricism" • Read: Helen Longino (1990), "Values and objectivity" • Listen: Conversation with Dr. Haixin Dang, University of Leeds • Live discussion Wed. 10/21 (meeting link and login on Canvas)

4 Values and Science

Date	Content
Week 10 10/26 & 10/28	<ul style="list-style-type: none"> • Topic: Values I • Read: Heather Douglas (2009), <i>Science, Policy, and the Value-Free Ideal</i>, ch 3-5 • Listen: Conversation with Prof. Melissa Jacquart, University of Cincinnati • Live discussion Wed. 10/28 (meeting link and login on Canvas)
Week 11 11/2 & 11/4	<ul style="list-style-type: none"> • Topic: Values II • Read: Heather Douglas (2009), <i>Science, Policy, and the Value-Free Ideal</i>, ch 6-7 • Read: Liam Bright (2018), "Dubois' Democratic Defence of the Value Free Ideal" • Listen: Conversation with Prof. Liam Bright, London School of Economics • Live discussion Wed. 11/4 (meeting link and login on Canvas)
Week 12 11/9 & 11/11	<ul style="list-style-type: none"> • Topic: Indigenous Knowledges • Read: Robin Wall Kimmerer (2013), <i>Braiding Sweetgrass</i>, selections • Listen: Expert guest conversation with TBD • Live discussion Wed. 11/11 (meeting link and login on Canvas)

5 Results of Scientific Enquiry

Date	Content
Week 13 11/16 & 11/18	<ul style="list-style-type: none"> • Topic: Scientific Realism • Read: Samir Okasha (2016), <i>Philosophy of Science: A Very Short Introduction</i>, ch 4 • Read: Larry Laudan (1981), "A confutation of convergent realism" • Listen: Expert guest conversation with TBD • Live discussion Wed. 11/18 (meeting link and login on Canvas)
Week 14 11/30 & 12/2	<ul style="list-style-type: none"> • Topic: Explanation I • Read: Carl Hempel and Paul Oppenheim (1948), "Studies in the logic of explanation" • Read: Angela Potochnik (2013) "Biological explanation" • Listen: Expert guest conversation with TBD • Live discussion Wed. 12/2 (meeting link and login on Canvas)
Week 15 12/7 & 12/9	<ul style="list-style-type: none"> • Topic: Explanation II • Emily Sullivan and Kareem Khalifa (2019), "Idealizations and understanding: Much ado about nothing?" • No expert guest • Live review session Wed. 12/9 (meeting link and login on Canvas)