

PHIL 303: Introduction to Philosophy of Science

Instructor: Professor Josh DiPaolo

Office Hours: TTh 9:30-10:45/4-4:15 & By Appointment

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Office: Humanities 311C

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Class: TTh 11:30-12:45 LH 304

Description

Modern science is among the most powerful tools humanity has ever known. It has allowed us to understand and explore the universe, to cure polio, and to provide you with access to much of the world's accumulated knowledge with no more than a reach into your pocket or a question for "Alexa." Unfortunately, it has also allowed us to create nuclear weapons and other dangerous forms of technology. Moreover, because of science's success, it has often been abused. Attempts to subjugate individuals to lower castes have often been justified on the basis of scientific "knowledge." Scientific "methods" have been appealed to in order to sow doubt about evolution, climate change, and the health risks associated with tobacco and vaccines. What is science? Why is it so powerful? Why is it abused in these ways? In this class, we'll try to understand what distinguishes science from other forms of inquiry, focusing on both its strengths and its weaknesses. We will pay particular attention to the human and social aspects of science. Far from always being an open and impartial endeavor guided only by truth aimed only at progress, science is often a messy affair practiced by biased thinkers and guided by incentives unrelated to truth. In this class, we'll attempt to improve our understanding of this relationship between science and our (imperfect) humanity.

Truth-Seeking

Philosophy classes differ from other kinds of classes. You will be a truth-seeker in this class, not a mere information consumer. Rather than just learning what others have thought, you will try to answer course questions through rational means.

Questions

1. What is philosophy of science?
2. How did science develop?
3. What distinguishes science from other forms of inquiry?
4. What can we learn from the history of science?
5. What causes ignorance in science?
6. What is bias? Is bias always bad?
7. How does bias relate to closed-mindedness?
8. What causes ignorance about science?
9. What is the "replication crisis" in science? How should it be solved?
10. Why should people trust science?

Goals

By the end of this semester, you should be able to:

1. Read and comprehend complex philosophical texts.
2. Briefly summarize complex philosophical texts.
3. Understand and clearly explain prominent answers to Questions 1-10.
4. Carefully defend your own thoughts about Questions 1-10.

Along the way, you will:

1. Improve your analytical skills.
2. Help your peers learn about philosophy of science.
3. Collaborate with your classmates to produce a Building Knowledge project.

Texts

All texts will be freely available on Titanium. Expect to read **30 pages** of difficult philosophy each week. Read assigned readings **before** class.

General Education (GE) Requirements and Learning Goals

GE Requirement	This course meets the requirement for GE category B.5 – Implications and Explorations in Mathematics and Natural Science.
Grade	A grade of D or higher is required to meet this GE requirement.
GE Learning Goals	<ul style="list-style-type: none"> a. Integrate themes in science, mathematics and/or quantitative reasoning from cross-disciplinary perspectives. b. Solve complex problems that require science, mathematics and/or quantitative reasoning. c. Relate science, mathematics and/or quantitative reasoning to significant social problems or to other related disciplines. d. When deemed appropriate, apply disciplinary concepts from mathematics and the natural sciences in a variety of settings, such as community-based learning sites and activities.

Grading Policy

Grading	<table border="0" style="margin-left: 20px;"> <tr><td>Weekly Quizzes</td><td style="text-align: right;">80 (20%)</td></tr> <tr><td>Short Papers</td><td style="text-align: right;">80 (20%)</td></tr> <tr><td>Abstracts</td><td style="text-align: right;">40 (10%)</td></tr> <tr><td>Phil Life Posts</td><td style="text-align: right;">20 (5%)</td></tr> <tr><td>Final Project</td><td style="text-align: right;">120 (30%)</td></tr> <tr><td><u>Final Paper</u></td><td style="text-align: right;"><u>60 (15%)</u></td></tr> <tr><td></td><td style="text-align: right;">400 Points</td></tr> </table>	Weekly Quizzes	80 (20%)	Short Papers	80 (20%)	Abstracts	40 (10%)	Phil Life Posts	20 (5%)	Final Project	120 (30%)	<u>Final Paper</u>	<u>60 (15%)</u>		400 Points	<table border="0" style="width: 100%;"> <tr><td>A+</td><td style="text-align: right;">98-100%</td><td style="text-align: right;">392-400 Points</td></tr> <tr><td>A</td><td style="text-align: right;">92-97%</td><td style="text-align: right;">368-391 Points</td></tr> <tr><td>A-</td><td style="text-align: right;">90-91%</td><td style="text-align: right;">360-367 Points</td></tr> <tr><td>B+</td><td style="text-align: right;">88-89%</td><td style="text-align: right;">352-359 Points</td></tr> <tr><td>B</td><td style="text-align: right;">82-87%</td><td style="text-align: right;">328-351 Points</td></tr> <tr><td>B-</td><td style="text-align: right;">80-81%</td><td style="text-align: right;">320-327 Points</td></tr> <tr><td>C+</td><td style="text-align: right;">78-79%</td><td style="text-align: right;">312-319 Points</td></tr> <tr><td>C</td><td style="text-align: right;">72-77%</td><td style="text-align: right;">288-311 Points</td></tr> <tr><td>C-</td><td style="text-align: right;">70-71%</td><td style="text-align: right;">280-287 Points</td></tr> <tr><td>D+</td><td style="text-align: right;">68-69%</td><td style="text-align: right;">272-279 Points</td></tr> <tr><td>D</td><td style="text-align: right;">62-67%</td><td style="text-align: right;">248-271 Points</td></tr> <tr><td>D-</td><td style="text-align: right;">60-61%</td><td style="text-align: right;">240-247 Points</td></tr> <tr><td>F</td><td style="text-align: right;">0-59%</td><td style="text-align: right;">0-239 Points</td></tr> </table>	A+	98-100%	392-400 Points	A	92-97%	368-391 Points	A-	90-91%	360-367 Points	B+	88-89%	352-359 Points	B	82-87%	328-351 Points	B-	80-81%	320-327 Points	C+	78-79%	312-319 Points	C	72-77%	288-311 Points	C-	70-71%	280-287 Points	D+	68-69%	272-279 Points	D	62-67%	248-271 Points	D-	60-61%	240-247 Points	F	0-59%	0-239 Points
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Participation	25 points will be deducted from your final grade if you do not regularly participate or you regularly distract others.																																																						
Attendance	You have 2 free absences. Each unexcused absence results in 2.5 points being deducted from your final grade.																																																						
Extra Credit	You may complete an optional assignment for up to 10 points extra credit. No other extra credit will be offered upon request.																																																						

Please ask questions about these policies if you're not sure you understand them.

Coursework Descriptions

Attendance	Attendance is required because you won't do well in the class if you don't attend. Please get two classmates' contact info to ask what you missed if you miss class.
Weekly Quizzes	<p>8 Quizzes/10 Points Each. To give you incentive to read the assigned articles carefully, you will complete weekly reading quizzes on Titanium. Current plan: they are due on Fridays after the week's classes. If this results in people not doing the reading before class, this policy will change and quizzes will be due before class. Your lowest quiz score will be replaced with a 10.</p> <p style="text-align: center;"><i>Satisfies a and c of B.5 GE Requirement</i></p>

Short Papers

2 Papers/40 Points Each. In 500 words, you will carefully defend your thoughts on a particular philosophical question addressed in class. Prompts will be provided. You will have one week to complete each paper. Papers will be submitted on Titanium. Please submit as word documents or pdfs.

Satisfies a-d of B.5 GE Requirement and Writing Requirement

Abstracts

2 Abstracts/20 Points Each. Science is collaborative. Scientists learn from other scientists. This assignment gives you an opportunity to mimic that learning structure. You will be assigned two course readings. Your job is to summarize each reading in 150-200 words. Those summaries will be used by your classmates for two purposes. First, students may read the abstract before doing that reading when it's assigned. Second, students will use the abstracts to guide them on their final project. Submit these on Titanium in a word document or pdf. I'll share them with the class. Others are relying on you. Do a good job!

Satisfies a and c of B.5 GE Requirement

Phil Life Posts

2 Sets of Posts/Comments/10 Points Each. To help you get in the habit of approaching your life philosophically, you will complete two "philosophy in life" posts in the discussion forums on Titanium. For these assignments, you will write about connections between your life and what you've learned or thought about in this course. You will also read and comment on your peers' posts.

Satisfies a-d of B.5 GE Requirement

Final Project

120 Points. Building Knowledge Project. This is a semester-long project. Throughout the semester, you will work in a group on a project of your choice. The aim of the project is to share ideas related to philosophy of science with others. It can take many forms.

- Website: Construct a website that communicates a concept learned in class to the public, and that applies it to a real-world problem.
- Video: Create a video that communicates a concept learned in class to the public, and that applies it to a real-world problem.
- Game: Create a game (computer game, board game, parlor game, etc.) that illustrates a concept learned in class, and that could lead some players to arrive at interesting conclusions related to philosophy of science.
- Interview: Interview people who work in science related fields about philosophical questions they confront, and then create a video or a website in which you analyze your interview material.
- Other: Be creative. Do what interests you!

This project will have three main stages. Early in the semester, you will choose a project to work on, and you'll set some goals to meet by the middle of the semester. Around the middle of the semester, you'll submit an update on the work you've done, which will end with you giving me a suggested midterm project grade. At the end of the semester, you'll submit a project portfolio. The project portfolio will include your (i) project, your (ii) online discussion contributions, and (iii) all project feedback you've received. At the end of the semester, your group will present your project to the class.

Throughout the semester, you will provide weekly updates on your project by contributing to an online discussion on Titanium. In class, you will regularly

discuss your project with me, your group, and other students. I will provide more detailed information about the project early in the semester.

Overview

1. Submit Goals
2. Submit Weekly Updates
3. Submit Midsemester Update
4. Submit Portfolio: Project, Discussion Posts, and Feedback
5. Presentation

Remember: *you* and your group members get to select the type of project you work on, and you will provide me with a suggested grade on your project. I want to give you an opportunity to work on something that genuinely interests you. And I want you to reflect on your own learning.

Satisfies a-d of B.5 GE Requirement and Writing Requirement

Final Paper

60 Points. Your group will write an 800-word paper describing your project, how it relates to what you learned in class, and what you'd like others to learn from it.

Satisfies a-d of B.5 GE Requirement and Writing Requirement

Participation

Participating in class benefits you and others. We learn while we attempt to express our thoughts. And since you have a unique perspective, everyone else in the class learns when you share that perspective. Here are some ways to participate:

1. Ask questions about the readings or lectures.
2. Answer questions when asked.
3. Contribute your perspective to a discussion.
4. Raise objections to arguments.
5. Mention a relevant life experience at an appropriate time.
6. Discuss course material with me outside of class.
7. Participate during small group activities.
8. Complete in-class writing assignments.

Satisfies a-d of B.5 GE Requirement

Communication

Office Hours

I have office hours scheduled on Tuesdays and Thursdays. This means I will be available in my office to discuss course material (or other issues). If my scheduled office hours aren't convenient, feel free to try to schedule a different time to meet.

Contact

Outside of office hours, you can reach me at my email address. I will usually respond within 24 hours. Feel free to get back in touch if I don't. **If you have a question about the course, please check the syllabus before emailing.**

You

I expect you to regularly check your email and Titanium for announcements.

Accommodations

I will do my very best to help students with disabilities, special needs, or learning challenges succeed in this course. Students with disabilities who need accommodations, access to technology, or information about emergency building/campus evacuation processes should contact Disability Support Services. Services are available to students with a wide range of disabilities and conditions.

Phone: (657) 278-3112

Website: www.fullerton.edu/dss

Electronics

Laptops	Permitted, but should only be used for classwork. If you're not using them for class purposes, you will distract yourself, your classmates, and me. Please don't do that.
Phones	The only time your phone should be out in class is if you're consulting class readings, or if I give you a moment for a mental break. Every time I see someone on their phone when they shouldn't be, it distracts me. That means the education of everyone in the class is negatively affected. Please respect your peers' right to learn without distraction.

Academic Integrity & Plagiarism

Statement Please only submit work that is your own. Doing otherwise is one of the worst mistakes you can make in your academic career. When students plagiarize in my classes, they receive a score of 0 points on the assignment and I refer them to the Dean of Students' office.

Plagiarism The university defines 'plagiarism' as "the unacknowledged and inappropriate use of the ideas or wording of another writer" and instructs me to include the following info on my syllabus:

If plagiarism is found in your work, you will be subject to prosecution to the fullest extent of university code, which will result in a failure of the assignment and will probably result in your failure of the course. Confirmation of plagiarism precludes you from being eligible to repeat the course under the university's course repeat and grade forgiveness policy. For complete details regarding the university's policies about plagiarism and other forms of cheating, see

<http://www.fullerton.edu/integrity/student/AcademicIntegrityResources.asp>
[http://www.fullerton.edu/senate/publications_policies_resolutions/ups/UPS%20300/UPS% 20300.021 .pdf](http://www.fullerton.edu/senate/publications_policies_resolutions/ups/UPS%20300/UPS%20300.021.pdf)

<u>Emergencies</u>

To be prepared for classroom emergencies, please visit: http://prepare.fullerton.edu

Tentative Schedule

Week 1	1/21 Course Introduction 1/23 Course Introduction	No Reading Barker & Kitcher Science and Philosophy
Week 2	1/28 Scientific Revolution 1/30 Demarcating Science	Barker & Kitcher Modern Science: A Brief History Godfrey-Smith Sketch of the Scientific Revolution Kitcher Believing Where We Cannot Prove
Week 3	2/4 Reading Philosophy 2/6 Logical Positivism	Concepcion How to Read Philosophy Godfrey-Smith Logic Plus Empiricism
Week 4	2/11 History 2/13 Social Structure	Okasha Scientific Change and Scientific Revolutions Godfrey-Smith Naturalism and the Social Structure of Science Abstracts Due 2/15 11:59pm
Week 5	2/18 Bias 2/20 Bias	Saul Feminism, Bias, and Science Saul (Cont'd)
Week 6	2/25 Ignorance 2/27 Vice	Tuana Coming to Understand Battaly Closed-Mindedness as an Intellectual Vice Short Paper 1 Due 3/1 11:59pm
Week 7	3/3 Climate Science 3/5 Science Denial	Broome Science Merchants of Doubt (In-Class Video) Lewandowsky et al. The Subterranean War on Science Whyte Indigenous Climate Change Studies Phil Life Post 1 Due 3/13 11:59pm
Week 8	3/10 The Tobacco Strategy 3/12 Science Denial	Oreskes & Conway Doubt is Our Product Oreskes & Conway Challenging Knowledge: How Climate Science Became a Victim of the Cold War
Week 9	3/17 Denial: Fixing the Problem? 3/19 Denial: Fixing the Problem?	Cassam Bad Thinkers Nguyen Escape the Echo Chamber McKenna Climate Change: 3 Ways to Market the Research
Week 10	3/24 Work on Projects 3/26 Work on Projects	
Week 11	SPRING BREAK	
Week 12	4/7 Replication Crisis 4/9 Work on Projects	Baker Is There a Reproducibility Crisis? Stereothreat (In-Class Podcast)
Week 13	4/14 Medical Replication Crisis. 4/16 Replication Crisis Analysis	Freedman Lies, Damned Lies, and Medical Science Fiddler & Wilcox Reproducibility of Scientific Results (Skip §3.3)
Week 14	4/21 Trusting Science 4/23 Conclusion	Oreskes Science Isn't Perfect, But We Should Still Trust it Short Paper 2 Due 4/23 11:59pm
Week 15	4/28 Catch-Up/Work on Projects 4/30 Catch-Up/Work on Projects	Phil Life Post 2 Due 4/28 11:59pm
Week 16	5/5 Work on Projects 5/7 Presentations	
Week 17	5/14 Presentations (11-12:50)	