History and Philosophy of Science

PHIL 3350-090 Summer 2022

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Office hours: On Zoom, by appointment.

Course Content and Objectives.
From the scientific revolution, through logical positivism and Darwinian evolution, students in this class will interrogate key moments in the history of science by investigating the work of figures such as Aristotle, Copernicus, Galileo, Newton, and Darwin with a philosophical lens. These primary texts will be considered using methods modeled by philosophers of science and applied to cases in the history of science. We will investigate scientific paradigm shifts, what constitutes a scientific theory, scientific advances and pitfalls. Students will also learn the beginnings of some technical methods in philosophy including basic deductive logic.

Some questions that will be pursued as the course proceeds are:

1. What are the roots of the activities we call *science*?
2. What distinguishes scientific methods from other knowledge-generating methods?
3. How universal are the methods within *science*?
4. What are the broader social implications of scientific activities?

Teaching and Learning Methods.
Students are required to watch weekly lecture-style video slideshows which will introduce the week's material. These videos will be contained in the "Media Gallery" sidebar tab, and will be important for course content, but also for reminders and information about other course requirements (e.g., assignment reminders). A variety of assignments will be required for this class including 3 short papers (1-2 pages), 2 longer papers (3-5 pages), and weekly online discussion posts. There will be four opportunities to submit short papers throughout the course of the semester.

Course Requirements
You should read all the required readings each week and watch the accompanying video lectures. Read any supplementary readings (some will be provided) to help further your understanding or to prepare for writing papers. You will be required to complete a weekly discussion post and submit two long papers and three short papers throughout the term. Discussion posts must be completed the week of the presented material. Discussion posts will open Monday of each week and must be completed by the next Sunday. In order to receive full credit for discussion posts, you must write one original post of at least 200 words and at least one

reply to a peer. All paper topics will be assigned with ample time to complete; see assignment given and due dates in the course schedule below. All papers topics are designed to examine material from the lectures and the readings for this class. The short papers will vary in style and may include responses to passages from historical or more recent philosophical texts and "formal" assignments, in which you have to use geometry, elementary deductive logic or probability theory or a combination of all three. Detailed instructions on what is expected in all papers and assignments will be announced in lecture videos and appear on the Canvas page.

Grading

Grades will be based on the following:

1. 3/4 Short papers (1-2 pages) 10% each (30% total)
2. 2 Long papers (3-5 pages) 20% each (40% total)
3. 10/11 Weekly Discussion Posts 3% each (30% total) - lowest discussion post score dropped

A+ = 100-97	C+ = 79-77
A = 96-93	C = 76-73
A- = 92-90	C- = 72-70
B+ = 89-87	D+ = 69-67
B = 86-83	D = 66-63
B- = 82-80	D- = 62-60
	F = 59-0

Course Schedule

***Please note that the schedule is subject to change as the semester progresses; all changes will be announced through Canvas.*

Week 1, May 16-20

Introduction to the Philosophy of Science

To do:

- Read: Godfrey-Smith, P. (2003), "Introduction" (1.1-1.4) from *Theory and Reality: An Introduction to the Philosophy of Science* **and** Matthews, M. (1989) "Introduction" (pp. 1-4) from *The Scientific Background to Modern Philosophy*
- Watch the Introduction video (Syllabus and Introduction to the History and Philosophy of Science).
- Complete week 1 discussion post and response to a peer by Friday, May 20th

Week 2, May 23-27

The Scientific Revolution I

To do:

- Read: Matthews: "Aristotle" (pp. 5-32) **and** "Copernicus" (pp. 33-44) **and** "Galileo" (pp. 53-86)
- Watch the lecture video on The Scientific Revolution I
- **Review Short Paper 1 assignment**, a passage analysis of Aristotle's Four Causes, due Friday, June 10 (11:59PM)
- Complete week 2 discussion post and response to a peer by Sunday, May 29th

Week 3, May 30 - June 3

The Scientific Revolution II

To do:

- Read: Matthews: "Descartes" (pp. 87-108) **and** "Newton" (pp. 133-158)
- Watch the lecture video on The Scientific Revolution II
- Complete week 3 discussion post and response to a peer by Sunday, June 5th

Week 4, June 6-10

Logical Positivism I: Confirmation, Explanation

To do:

- Read: and Hempel, C. (1966) "Laws and their Role in Scientific Explanation" (pp. 47-69) **and** Cartwright, N (1980) "The Truth Doesn't Explain Much" (pp. 159-163).
- Supplemental reading: Downes, S. (1997), "Logical Positivism/Logical Empiricism" (pp. 218-224).
- Watch the lecture video on Logical Positivism I
- Complete week 4 discussion post and response to a peer by Sunday, June 12th
- **Turn in Short Paper 1** by Friday, June 10 (11:59PM)
- **Review Long Paper 1 assignment** on the Aristotlian vs. Copernican and Galilean Worldviews due Friday, July 8 (11:59pm)

Week 5, June 13-17

Logical Positivism II: Falsification, Hypothesis Testing

To do:

- Read: Popper, K. (1963) Chapter 1: "Science: Conjectures and Refutations" (pp. 1-49)
- Watch the lecture video on Logical Positivism II

- **Review Short Paper 2 assignment** on Falsification and Holism about Hypothesis Testing due Friday, July 1 (11:59PM)
- Complete week 5 discussion post and response to a peer by Sunday, June 19th

Week 6, June 20-24

Scientific Change

To do:

- Read: Kuhn, T. (1962/2012) Chapter IX: "The Nature and Necessity of Scientific Revolutions" (pp.1-15) **and** Lakatos, I. (1970) "Falsification and the Methodology of Scientific Research Programmes" (pp. 170-196).
- Watch the lecture video on Scientific Change
- Supplementary reading: Kuhn, T. (1962/2012) Chapter X: "Revolutions as Changes of World View" and Havstad, J. & Smith, A. (2019) "Fossils with Feathers and the Philosophy of Science"
- Complete week 6 discussion post and response to a peer by Sunday, June 26th

Week 7, June 27-July 1

Darwinian Revolution I: Creationism and Darwinian Evolution

To do:

- Read: Sober, E. (2000), Chapter 2: "Creationism" in *Philosophy of Biology* (pp. 27-57) **and** excerpt from Darwin's *The Origin of Species*
- Watch the lecture video on the Darwinian Revolution I
- **Turn in Short Paper 2** by July 1 (11:59pm)
- Complete week 7 discussion post and response to a peer by Sunday, July 3rd

Week 8, July 5-8

Darwinian Revolution II: Evolution and Gene Concepts

To do:

- Read: Griffiths, P.E. and K. Stotz, Chapter 5: "Gene" (pp. 85-102)
- Watch the lecture video on the Darwinian Revolution II
- **Turn in Long Paper 1** by Friday, July 8 (11:59PM)
- **Review Short Paper 3 assignment**, a passage analysis of Darwin's "Tangled Bank," due Friday, July 29 (11:59PM)
- Complete week 8 discussion post and response to a peer by Sunday, July 10th

Week 9, July 11-15

Science and Values I

To do:

- Read: Gould, S. J. (1993) "American Polygeny and Craniometry before Darwin" (pp. 84-115). Also read: Tabery, J. (2015) "Why Is Studying the Genetics of Intelligence So Controversial?" (pp. 9-14) **and** Piffer, Davide (2015) "A Review of Intelligence GWAS hits" (pp. 43-50).
- Watch the lecture video on Science and Values I
- **Review Long Paper 2 assignment** on Kuhnian Revolutions and Lakatosian Research Programmes due Friday, August 5 (11:59pm)
- Complete week 9 discussion post and response to a peer by Sunday, July 17th

Week 10, July 18-22

Science and Values II

To do:

- Read: Kuhn, T. (1977) "Objectivity, Value Judgment and Theory Choice" and Rudner, R. (1953), "The Scientist Qua Scientist Makes Value Judgments"
- Watch the lecture video on Science and Values II
- Complete week 10 discussion post and response to a peer by Sunday, July 24th

Week 11, July 25-29

Science and Values III

To do:

- Read: Longino, H. (1990) Chapter 4: "Values and Objectivity" (pp. 62-82) from *Science as Social Knowledge* **and** Douglas, H. (2000) "Inductive Risk and Values in Science" (pp. 559-79).
- Watch the lecture video on Science and Values III
- **Turn in Short Paper 3** by Friday July 29 (11:59pm)
- **Review Short Paper 4 assignment** on Science and Values, due Friday, August 13 (11:59pm)
- Complete week 1 discussion post and response to a peer by Sunday, July 31st

Week 12, August 1-3 (Last day of summer classes)

Wrap-up

To do:

- Watch the Wrap-up lecture video
- **Turn in Long Paper 2** by August 6 (11:59pm)
- **Turn in Short Paper 4** by Friday, August 13 (11:59)

Class Policies

Classroom Civility Statement: We will be covering controversial topics in the class—racism, sexism, the sources of inequality, our own implicit biases. It is essential that we maintain a safe and constructive classroom environment, where students with a variety of different perspectives can feel comfortable sharing their ideas and reasons for those ideas. Please be respectful, both as a speaker and a listener. We will provide optional discussion boards for a chance to engage the course material. Give classmates the benefit of the doubt (especially if they are saying something with which you do not agree). Feel free to ask for clarifications, reasons, unstated assumptions, and evidence. Be constructive.

Dates/Deadlines: The paper deadlines are strict; late papers will receive point deductions of a half letter grade per day. If you are unable to complete any one of the assignments on time, a typed explanation with appropriate documentation must be given to us before or within one week after the deadlines. Discussions will be opened Monday of every week and closed the following Sunday. To receive full credit on the discussion posts, you must complete one original post and one response to a peer.

Cheating/Plagiarism: Students are responsible for knowing and understanding the University's Code of Conduct as it pertains to plagiarism: http://www.admin.utah.edu/ppmanual/8/8-10.html. In short, when you draw upon any source (class notes, an article, a website, a textbook, etc.), you must cite that source whether you are quoting from it directly or only paraphrasing it. The basic idea here is that you can draw on someone else's idea(s), but you cannot spin someone else's idea(s) as your own. Any Paper with evidence of plagiarism will be assigned a zero, and the student's action will be reported to the Dean.

Disability Services: The University of Utah seeks to provide equal access to its programs, services and activities for people with disabilities. If you will need accommodations in the class, reasonable prior notice needs to be given to the Center for Disability and Access, 162 Olpin Union Building, 801.581.5020 (V/TDD). CDA will work with you and the professor to make arrangements for accommodations. All written information in this course can be made available in alternative format with prior notification to the CDA.

University Safety Statement: The University of Utah values the safety of all campus community members. To report suspicious activity or to request a courtesy escort, call campus police at 801-585-COPS (801-585-2677). You will receive important emergency alerts and safety

messages regarding campus safety via text message. For more information regarding safety and to view available training resources, including helpful videos, visit safeu.utah.edu.

Addressing Sexual Misconduct: Title IX makes it clear that violence and harassment based on sex and gender (which Includes sexual orientation and gender identity/expression) is a civil rights offense subject to the samekinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, color, religion, age, status as a person with a disability, veteran's status orgenetic information. If you or someone you know has been harassed or assaulted, you are encouraged to report it to the Title IX Coordinator in the Office of Equal Opportunity and Affirmative Action, 135 Park Building, 801-581-8365, or the Office of the Dean of Students, 270 Union Building, 801-581-7066. For support and confidential consultation, contact the Center for Student Wellness, 426 SSB, 801-581-7776. To report to the police, contact the Department of Public Safety, 801-585-2677(COPS).

Wellness Statement: Personal concerns such as stress, anxiety, relationship difficulties, depression, cross cultural differences, etc., can interfere with a student's ability to succeed and thrive at the University of Utah. For helpful resources contact the Center for Student Wellness at www.wellness.utah.edu or 801-581-7776.

Resource Centers: If you are a student veteran, the U of Utah has a Veterans Support Center located in Room 161 in the Olpin Union Building. Hours: M-F 8-5pm. Please visit their website for more information about what support they offer, a list of ongoing events and links to outside resources: http://veteranscenter.utah.edu/. Please also let me know if you need any additional support in this class for any reason.

If you are a member of the LGBTQ community, we want you to know that our classroom is a safe zone*.

Additionally, the U of Utah has an LGBT Resource Center on campus. They are located in Room 409 in the Oplin Union Building. Hours: M-F 8-5pm. You can visit their website to find more information about the support they can offer, a list of events through the center and links to additional resources: http://lgbt.utah.edu/. Please also let me know if there is any additional support you need in this class.

If you are an English language learner, please be aware of several resources on campus that will support you with your language and writing development. These resources include: the Writing Center (http://writingcenter.utah.edu/); the Writing Program (http://writing-program.utah.edu/); the English Language Institute (http://continue.utah.edu/eli/). Please let us know if there is any additional support you would like to discuss for this class.