

History and Philosophy of Science

PHIL 3350-001 Fall 2023

MWF 10:45-11:35

GC 3660

Instructor: TJ Perkins
t.perkins@utah.edu

Office hours: Mondays 12:00-1:00 or by appointment. Room: CTIHB 405.

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?

Course Outcomes: At the end of the course, students will be able to:

- understand key ideas, arguments, and achievements of the philosophy of science.
- connect scientific methods to philosophical commitments and broader social implications.
- write clear and concise arguments incorporating the points above.
- apply ideas in the course to their experiences and daily life.
- improve general skills in reading comprehension, reasoning, and argument.

Teaching and Learning Methods: Over the course of the semester, students will be involved in lectures and discussions, with some small-group work. Students are expected to read assigned texts carefully before class and come to class meetings prepared to discuss key issues and ideas. Course outcomes will be achieved by individual reflection, followed by discussion, and then articulation of ideas in writing. Assignments are structured so students build up to more difficult projects later in the semester.

Requirements and Grading.

1. **Participation (20%):** Participation in this class includes arriving on time, contributing to class discussion, and participating in various class exercises and activities. Thoughtful

participation in class discussions is an important component of this course. Please come to each meeting prepared to discuss the assigned readings. If you have to miss a class meeting for reasons beyond your control (i.e. excused absence), then makeup options will be made available upon request. At around the half-way mark in the semester (around Fall Break), I will provide each student with a grade of their participation performance so far. Consider this a kind of performance review.

2. **Weekly Reading Reflections (30%):** Weekly reading reflections are scheduled every week (due by the class period in which we discuss the reading you are covering (see 'Readings Schedule' for details). For this assignment write 1-2 pages, (1) summarizing the main points of the assigned text, (2) pick out one or two key concepts or arguments to examine, and (3) conclude with questions or objections. These are designed to enhance your understanding of key points in an assigned reading or to help you prepare for a class activity and/or paper assignment (also, they form the basis of your "lead a discussion" assignment). These will be assigned weekly but only 12 count toward your final grade.
3. **Paper 1 (15%):** 5-7 pages, typewritten and double-spaced in a 12-point font on a key issue from course readings and discussion from the first half of the semester. More details on writing a successful philosophy paper will be provided in class.
4. **Lead a discussion (10%):** One presentation (~10 minutes) on an assigned article or chapter. Presentations will take place at the beginning of class, followed by general discussion. Signups for presentations will be during the second week of classes. Your presentation should (1) summarize the main points of the assigned text, (2) pick out one or two key concepts or arguments to examine, and (3) conclude with questions or objections, leading into a short Q&A. Before you present, you may meet with the professor to discuss the material, ideas for your presentation, and grading rubric, but this is not necessary.
5. **Final Project (25%):** 7-10 pages, typewritten and double-spaced in a 12-point font on a key issue from course readings and discussion. Topics will be at your choice, but you must run your proposal by me first. (5% total of this 25% will encompass your project proposal and presentation).

*All written assignments should be formatted in 12-point font, double spaced, and 1" margins.

Summary of Graded Requirements

Participation (20%)

Weekly Reflections x12 (30%)

Paper 1 (15%)

Discussion Leader (10%)

Paper 2 (25%)

Grading scale: The grading scale for this course is as follows:

A = 93-100

B+ = 89-87

A- = 92-90

B = 86-83

B- = 82-80
C+ = 79-77
C = 76-73
C- = 72-70

D+ = 69-67
D = 66-63
D- = 62-60
F = 59-0

Course Schedule:

All dates are subject to change as we proceed through the semester. Appropriate notice will be offered and adjustments to due dates will be made.

Module 1: The Scientific Revolution

Week 1

Friday August 25

- Godfrey-Smith: "Introduction"

Week 2

Monday August 28

- Matthews: "Aristotle"

Wednesday August 30

- Matthews: "Galileo"

Week 3

Monday September 4 (Labor Day – no classes)

Wednesday September 6

- Matthews: "Descartes"

Friday September 8

- Matthews: "Newton"

Module 2: Logical Positivism/Empiricism

Week 4

Monday September 11

- Downes: "Logical Positivism and Logical Empiricism"

Wednesday September 13

- Ayer: "The Elimination of Metaphysics"

Week 5

Monday September 18

- Hempel: "Laws and Explanation"

Wednesday September 20

- Cartwright: "The Truth Doesn't Explain Much"

Week 6

Monday September 25

- Popper 1 (Demarcation): "Conjectures and Refutations"

Wednesday September 27

- Popper 2 (Falsifiability): "Conjectures and Refutations"

Week 7

Monday October 2

- Ladyman: “Falsification”

Week 8 (Fall Break – No Classes)

Monday October 9

Wednesday October 11

Module 3: Revolutions and Scientific Change

Week 9

Monday October 16

- Kuhn: “The Nature and Necessity of Revolutions”

Wednesday October 18

- Ruse: “What Kind of Revolution Occurred in Geology?”

Week 10

Monday October 23

- Lakatos: “Falsification and the Methodology of Scientific Research Programmes”

Wednesday October 25

- Havstad & Smith: “Fossils with Feathers and Philosophy of Science”

Week 11

Monday October 30

- Cleland: “Methodological and Epistemic Differences between Historical Science and Experimental Science”

Wednesday November 1

- Fastovsky: “Ideas in Dinosaur Paleobiology?”

Module 4: Science and Human Values

Week 12

Monday November 6

- Kuhn: “Objectivity, Value Judgement, and Theory Choice”

Wednesday November 8

- Rudner: “The Scientist *qua* Scientist Makes Value Judgements”

Week 13

Monday November 13

- Douglas: “Inductive Risk and Values in Science”

Wednesday November 15

- Havstad: “Sensational Science, Archaic Hominid Genetics, and Amplified Inductive Risk”

Week 14

Monday November 20

- Longino: “Values and Objectivity”

Wednesday November 22 (Thanksgiving – No Class)

Week 15

Monday November 27

- Kovaka, “Climate change denial and beliefs about science”

Wednesday November 29

- Bright and Heesen, "To be Scientific is to be Communist"

Week 16

Monday December 4

- Whyte, "On the role of traditional ecological knowledge as a collaborative concept"

Wednesday December 6

- Course review discussion

(Thursday December 7 – Last day of classes)