

PHIL 273W
Philosophy of Science

Professor: Naomi Fisher
Email: nfisher1@luc.edu
Office: Crown Center 335
Office hours: TR 1-2 pm or by appointment

Course Description

In this course we will first examine the nature of science and what we can reliably come to know about the world through the practice of science. Is science rational? Is it progressive? Are its claims to be regarded merely as useful heuristic devices, or claims about the way the world really is? These are questions we will examine in this course.

We will first look briefly at the history of scientific theorizing up through the scientific revolution of the 16th and 17th centuries. This history is helpful for two reasons: first, it helps us understand the causes leading up to the scientific revolution; second, it provides an in-depth understanding of the history of science, as a constantly changing, temporally bound, human endeavor. We will then turn to logical positivism (the “received view”), a view not just of science but of language generally as *only* meaningful if subject to empirical verification. This view dominated the philosophy of science in the first half of the 20th century, but was definitively refuted in the years following. We will look at critiques of logical positivism and the aftermath in recent philosophy of science, particularly in debates regarding scientific objectivity, the rationality of theory change, and the nature of scientific knowledge and explanation.

Readings

Nearly all readings will be from *Philosophy of Science: An Historical Anthology* edited by McGrew, Alspector-Kelly, and Allhoff (Wiley-Blackwell, 2009). I ask that you purchase this book and bring it to class with you. Any other readings will be handed out or sent to you as a pdf to print. *No laptops or other devices are allowed out in class.*

Short Papers (80% of grade):

We will have weekly 1-2 page papers, based on the reading for that week. They should be 500-1000 words, single-spaced please. These will fit on one sheet, front and back). I will send out potential topics (especially at the beginning) and instructions. These will be worth 80% of your grade. ***You can skip three times***, for a total of 11 short papers. If you do more than 11, I will drop the lowest grade(s). They are due, along with the reading, every Tuesday prior to class.

Bring a hard copy of your paper with you to class AND turn it in on sakai, please. We will work with your papers in class, through peer or self-evaluations, presentations, and discussions. If you skip that week, bring a hard copy of a previous paper with you to class so we can work with that.

Participation/Attendance (10% of grade):

You must attend class regularly, notify me in advance if you are going to miss, and participate in class discussion. *The baseline for this portion of your grade will be the percentage of classes you attended, excluding excused absences.*

Presentations (10% of grade):

Twice over the course of the semester, you will present your paper. This means articulating the central ideas of your paper, defending those to the class, fielding any questions about your paper, and opening up a discussion on the topic of your paper through a set of questions.

I will email you your grade with some brief comments and enter it on sakai.

Academic Integrity

Familiarize yourself with the Loyola academic integrity policy:
https://www.luc.edu/academics/catalog/undergrad/reg_academicintegrity.shtml Anyone who plagiarizes will fail the class.

Grades:

Grading will be on a 100-point scale. Your final grade will be calculated on the following scale. All grades will be available for viewing on sakai:

93+	A	77-79.9	C+
90-93.9	A-	73-76.9	C
87-89.9	B+	70-73.9	C-
83-86.9	B	67-69.9	D+
80-83.9	B-	60-66.9	D
		<60	F

SCHEDULE OF READINGS

Your short paper should be on the reading assigned for the week. They are DUE EVERY TUESDAY by the beginning of class. (ONE EXCEPTION is the FIRST WEEK of class—that paper is due THURSDAY.) Turn it in on sakai AND bring a hard copy to class.

Ancient and Medieval Periods

Tuesday/Thursday 1/17-19: Atomism and Aristotelianism

Opening discussion/Syllabus

Democritus	1.1 “Atoms and Empty Space” (from Diogenes Laertius)
Aristotle	1.6 “Changes, Natures, and Causes”
Lucretius	1.11 “The Explanatory Power of Atomism”

Topic for paper 1 (due Thursday 1/19):

Aristotle posits that appeal to the *natures* of things are necessary to explain change, while the atomists (here Democritus and Lucretius) believe that there is nothing but atoms and void, and atoms can explain everything, including the natures of things. Briefly compare these views and defend one of them.

Tuesday/Thursday 1/24-26: Cosmology: Aristotle to Copernicus

Ptolemy	1.12 “The Earth: Its Size, Shape, and Immobility”
Proclus	1.13 “The Weakness of the Hypotheses”
Maimonides	1.16 “Against the Reality of Epicycles and Eccentricities”
Copernicus	2.3 “The Motion of the Earth”

The Scientific Revolution

Tuesday/Thursday 1/31-2/2: Copernican Cosmology and Newtonian resolutions

Kepler	2.5 “A Man Ahead of His Time”
Kepler	2.6 “On Arguments about a Moving Earth”
Galileo	2.11 “The Copernican View Vindicated”
Newton	2.17 “General Scholium”
Newton	2.18 “The System of the World”

Tuesday/Thursday 2/7-9: Corpuscles, Induction, Newton

Boyle	2.12 “The ‘Corpuscular’ Philosophy”
Huygens	2.13 “Successful Hypotheses and High Probability”
Newton	2.14 “Inductive Methodology”
Newton	2.16 “Four Rules of Reasoning”
Bacon	3.1 “The Inductive Method”

The Modern Philosophers

Tuesday/Thursday 2/14-16: Rationalism and Empiricism

Descartes	3.2	“Rules for the Discovery of Scientific Truth”
Descartes	3.3	“Rationalism and the Scientific Method
Hume	3.7	“The Problem of Induction”
Hume	3.8	“The Nature of Cause and Effect”

Methodology and Revolution

Tuesday/Thursday 2/21-23

Herschel	4.3	“Hypotheses, Data, and Crucial Experiments”
Mill	4.4	“An Empiricist Account of Scientific Discovery”
Whewell	4.5	“Against Pure Empiricism”
Whewell	4.6	“The Causes Behind the Phenomena”
Darwin	4.9	“The Explanatory Scope of the Evolutionary Hypothesis”

Tuesday/Thursday 2/28-3/2

Peirce	4.10	“Induction as a Self-Correcting Process”
Peirce	4.11	“The Nature of Abduction”
Poincaré	4.12	“The Role of Hypotheses in Physical Theories”
Duhem	4.13	“Against Crucial Experiments”
Einstein	4.14	“On the Method of Theoretical Physics”

3/7-9 *Spring Break*

The Received View

Tuesday/Thursday 3/14-16: Carnap and Hempel

Carnap	5.1	“Theory and Observation”
Hempel	5.2	“Scientific Explanation”
Carnap	5.3	“Empiricism, Semantics, and Ontology”

Tuesday/Thursday 3/21-23: Science and cognitive meaning

Hempel	6.1	“Empiricist Criteria of Cognitive Significance: Problems and Changes”
Popper	7.1	“Science: Conjectures and Refutations”

Unit 6: After the Received View: Confirmation and Observations

Tuesday/Thursday 3/28-30

Quine	6.3	“Two Dogmas of Empiricism”
Putnam	6.5	“What Theories are Not”

Tuesday/Thursday 4/4-6

Hempel	6.2	“The Raven Paradox”
Goodman	6.4	“The New Riddle of Induction”
Hanson	6.6	“On Observation”

Unit 7: Methodology, Objectivity, and Rationality

Tuesday/Thursday 4/11-13

Kuhn	7.2	“The Structure of Scientific Revolutions”
Lakatos	7.3	“Science and Pseudoscience”

Tuesday/Thursday 4/18-20

Longino	“Values and Objectivity” (handed out)	
MacIntyre	“Epistemological Crises, Dramatic Narrative, and the Phil. of Science” (handed out)	

Tuesday/Thursday 4/25-27

Sarewitz	“Saving Science” (online reading—no need to print)	
TBD		