

PHIL 3410

History of Science: Ancients to Newton

Spring 2022

Section 001 – MWF 1:25pm – 2:15pm in [VAC 1B88](#)

Syllabus

The syllabus can be found at the course page: canvas.colorado.edu

Instructor

Joseph Wilson - joseph.wilson-1@colorado.edu

Office Hours. Tuesdays and Thursdays 12:00pm - 1:00pm on Zoom. Zoom meetings can be made by appointment.

Course Description

In this course we will have several goals:

Physics majors tend not to study the history of physics in any detail. Why not? Two reasons. First of all - and this is also why we tend to call what happened in the 17th c *the* Scientific Revolution - is because there is a common belief that Galileo (and others) at that time discovered a secure way to arrive at objective reality (i.e., they discovered scientific method.) From this perspective, everyone before Galileo was just blowing hot air. They were doing “metaphysics,” not science. Second, there is a common belief that, since Galileo, science has had us marching along this linear path toward objective truth. We know more than the last generation, they knew more than the previous generation. So why study people from long ago? After all, they were *wrong*.

But today we know that Newtonian science was wrong about pretty much everything, and one can make a case that current science is in some interesting ways closer to Aristotle than it is to Newton. So part of our goal in this class will be to ask, what is “science” anyway? And is there any truth to that belief that we can (that Galileo did) separate “real science” from “metaphysics”?

In addressing these kinds of questions we will also investigate the infancy of Western Science as it emerges from the mythopoetic tradition of ancient civilizations. In short, pre-Socratics like Thales (585 BCE) emphasized natural explanations and principles (*everything is water*) over mythological, God-driven explanations. Performing this investigation will reveal the long-standing biases and traditions that have been ingrained in Western thought since this first naturalistic-scientific revolution

Prerequisites: restricted to sophomores, juniors, and seniors. Recommended: 6 hours of philosophy course work.

Required Reading

All required readings can be found at the course canvas page, in the ‘Required Readings’ module.

Major Texts:

The Beginnings of Western Science, Lindberg

The Sleepwalkers, Koestler

The Swerve, Greenblatt

Course Requirements

Exam (90%). For each of the 3 units of the course, there will be an *exam*. These exams may be composed of short essay questions.

The exam dates are set on the course schedule:

- o Exams are only available *in class* on the day of the exam.

- o If you know that you will not be able to take one of the exams on its scheduled day, ***contact me ahead of time.***
- o **All 3 exams will require you purchase a Bluebook.** These are available at the student store in the UMC, and likely elsewhere. Make sure to pick them up ahead of time.

Attendance (10%). Attendance in class will comprise a small portion of your grade. This is mostly incentive to get you to attend class (which will be very good for your exam performance).

Technology in the Classroom

Unless otherwise stated in an accommodation, **students will not be permitted the use of laptops or other electronic devices in the classroom.** I really hate to do this, but it really is in your own interest. The use of laptops in the classroom has been linked to decreased performance in both users and classmates. As such, I will paternalistically enforce this policy. [If you really feel like you can't sit still for 50 minutes, no need to come to class. Take a day off.]

What Does a Philosopher Look Like?

Like many disciplines in the academy, philosophy has historically been dominated by white men. Stereotype threat is a psychological phenomenon that causes people to underperform in a discipline in the face of a stereotype that says that “people like them” aren’t good at that discipline. However, telling students that there are no actual differences in performance in a class can defuse the anxiety that the stereotype creates and subsequently undermines those tendencies to underperform. The stereotype that says that only white men can be good philosophers is false.

For more on this, visit: <http://looksphilosophical.tumblr.com/>

On Seeming Smart

Regardless of whether you’ve studied some of this material prior to this course, you might often find yourself feeling intimidated by the way academics write or talk. This might be because all disciplines employ jargon and concepts that you either might not have encountered before, or that you might have seen used differently. Jargon can be useful, but it can also be used to exclude people and make them feel like they don’t have a place in the conversation. Don’t feel that way and don’t be intimidated!

If you don't know what a term means, ask for a definition. If you don't know how a concept is being used, ask for clarification. For a very helpful essay that speaks to this (among other important things) see "On Being Good at Seeming Smart":

<http://schwitsplinters.blogspot.com/2010/03/on-being-good-at-seeming-smart.html>

Course Schedule – Subject to change at instructor’s discretion. You will be informed when any changes occur.

Week 1		Readings
Mon 01/10	Syllabus Internalist and Externalist Histories	Read the Syllabus
Wed 01/12	WHIG History	<i>Myth and Reality</i> , Frankfort and Frankfort
Fri 01/14	Mythopoeism, Early Greeks	
Week 2		
Mon 01/17	No Class - MLK Day	
Wed 01/19	Thales, Anaximander, Anaximenes	Lindberg, 1-33
Fri 01/21	Parmenides, Zeno, Heraclitus	
Week 3		
Mon 01/24	Pythagoras and Pythagoreanism	Koestler, 19-52

Wed 01/26	Aristarchus of the Pythagorean School	
Fri 01/28	The Pluralists	
Week 4		
Mon 01/31	Socrates and Plato	Koestler, 53-84 Lindberg, 33-43
Wed 02/02	Aristotle's Physics	
Fri 02/04		Lindberg, 45-66
Week 5		
Mon 02/07	Aristotle's Astronomy	Aristotle's <i>On the Heavens</i>
Wed 02/09		
Fri 02/11		Exam 1
Week 6		
Mon 02/14	Hellenistic Period	Lindberg, 67-162 (Over the next week)
Wed 02/16	Roman Period	
Fri 02/18		

Week 7		
Mon 02/21	Dark Ages	
Wed 02/23	Islamic Science	Lindberg, 163-192
Fri 02/25		
Week 8		
Mon 02/28	European Revival	Over the next week: Koestler, 87-117; Lindberg, 193-320; Optional: Lindberg, 321-356
Wed 03/02		
Fri 03/04	The Swerve	Read Greenblatt
Week 9		
Mon 03/07	The Swerve, Continued	Read more Greenblatt
Wed 03/09		
Fri 03/11	The Renaissance	
Week 10		
Mon 03/14	The Continuity Question	Lindberg, 357-367

Wed 03/16		
Fri 03/18		Exam 2
Week 11		
Mon 03/21	Spring Break - No Class	
Wed 03/23	Spring Break - No Class	
Fri 03/25	Spring Break - No Class	
Week 12		
Mon 03/28	Copernicus	Koestler, 121-222
Wed 03/30		
Fri 04/01	Kepler	Koestler, 227-427
Week 13		
Mon 04/04	Brahe	
Wed 04/06	Galileo	Koestler, Pt. 5
Fri 04/08		
Week 14		

Mon 04/11	Descartes	Descartes, <i>Meditation One</i>
Wed 04/13	Newton	Koestler, 504-509
Fri 04/15		
Week 15		
Mon 04/18	Objective Truth	Koestler, Epilogue Hesse, <i>The Social and Economic Roots of Newton's Principia</i>
Wed 04/20		
Fri 04/22	Chinese Science	Needham, <i>Human Laws and Laws of Nature</i> Sivin, <i>Why the Scientific Revolution Didn't Take Place in China - Or Didn't It?</i>
Week 16		
Mon 04/25	Chinese Science, Continued	
Wed 04/27		
Fri 04/29	Reading Day – No Class	
<i>FINAL EXAM</i>		In our usual class room

University Policies

Classroom Behavior

Both students and faculty are responsible for maintaining an appropriate learning environment in all instructional settings, whether in person, remote or online. Those who fail to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with race, color, national origin, sex, pregnancy, age, disability, creed, religion, sexual orientation, gender identity, gender expression, veteran status, political affiliation or political philosophy. For more information, see the policies on [classroom behavior](#) and the [Student Conduct & Conflict Resolution policies](#).

Requirements for COVID-19

As a matter of public health and safety, all members of the CU Boulder community and all visitors to campus must follow university, department and building requirements and all public health orders in place to reduce the risk of spreading infectious disease. Students who fail to adhere to these requirements will be asked to leave class, and students who do not leave class when asked or who refuse to comply with these requirements will be referred to [Student Conduct and Conflict Resolution](#). For more information, see the policy on [classroom behavior](#) and the [Student Code of Conduct](#). If you require accommodation because a disability prevents you from fulfilling these safety measures, please follow the steps in the “Accommodation for Disabilities” statement on this syllabus.

CU Boulder currently requires masks in classrooms and laboratories regardless of vaccination status. This requirement is a precaution to supplement CU Boulder’s COVID-19 vaccine requirement. Exemptions include individuals who cannot medically tolerate a face covering, as well as those who are hearing-impaired or otherwise disabled or who are communicating with someone who is hearing-impaired or otherwise disabled and where the ability to see the mouth is essential to communication. If you qualify for a mask-related accommodation, please follow the steps in the “Accommodation for Disabilities” statement on this syllabus. In addition, vaccinated instructional faculty who are engaged in an indoor instructional activity and are separated by at least 6 feet from the nearest person are exempt from wearing masks if they so choose.

If you feel ill and think you might have COVID-19, if you have tested positive for COVID-19, or if you are unvaccinated or partially vaccinated and have been in close contact with someone who has COVID-19, you should stay home and follow the further guidance of the [Public Health Office](#) (contacttracing@colorado.edu). If you are fully vaccinated and have been in close contact with someone who has COVID-19, you do not need to stay home; rather, you should self-monitor for symptoms and follow the further guidance of the [Public Health Office](#) (contacttracing@colorado.edu).

Accommodation for Disabilities

If you qualify for accommodations because of a disability, please submit your accommodation letter from Disability Services to your faculty member in a timely manner so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities in the academic environment. Information on requesting accommodations is located on the [Disability Services website](#). Contact Disability Services at 303-492-8671 or dsinfo@colorado.edu for further assistance. If you have a temporary medical condition, see [Temporary Medical Conditions](#) on the Disability Services website.

Preferred Student Names and Pronouns

CU Boulder recognizes that students' legal information doesn't always align with how they identify. Students may update their preferred names and pronouns via the student portal; those preferred names and pronouns are listed on instructors' class rosters. In the absence of such updates, the name that appears on the class roster is the student's legal name.

Honor Code

All students enrolled in a University of Colorado Boulder course are responsible for knowing and adhering to the Honor Code academic integrity policy. Violations of the Honor Code may include, but are not limited to: plagiarism, cheating, fabrication, lying, bribery, threat, unauthorized access to academic materials, clicker fraud, submitting the same or similar work in more than one course without permission from all course instructors involved, and aiding academic dishonesty. All incidents of academic misconduct will be reported to the Honor Code (honor@colorado.edu; 303-492-5550). Students found responsible for violating the academic integrity policy will be subject to nonacademic sanctions from the Honor Code as well as academic sanctions from the faculty member. Additional information regarding the Honor Code academic integrity policy can be found on the [Honor Code website](#).

Sexual Misconduct, Discrimination, Harassment and/or Related Retaliation

CU Boulder is committed to fostering an inclusive and welcoming learning, working, and living environment. The university will not tolerate acts of sexual misconduct (harassment, exploitation, and assault), intimate partner violence (dating or domestic violence), stalking, or protected-class discrimination or harassment by or against members of our community. Individuals who believe they have been subject to misconduct or retaliatory actions for reporting a concern should contact the Office of Institutional Equity and Compliance (OIEC) at 303-492-2127 or email cureport@colorado.edu. Information about university policies, [reporting options](#), and the support resources can be found on the [OIEC website](#).

Please know that faculty and graduate instructors have a responsibility to inform OIEC when they are made aware of incidents of sexual misconduct, dating and domestic violence, stalking, discrimination, harassment and/or related retaliation, to ensure that individuals impacted receive

information about their rights, support resources, and reporting options. To learn more about reporting and support options for a variety of concerns, visit [Don't Ignore It](#).

Religious Holidays

Campus policy regarding religious observances requires that faculty make every effort to deal reasonably and fairly with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. Let the instructor know if you require accommodations for religious observances and they will be provided.

See the [campus policy regarding religious observances](#) for full details.