**PHILOSOPHY 32: PHILOSOPHY AND THE RISE OF MODERN SCIENCE**

Winter 2023

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# Course Description

This course focuses on the development of natural philosophy, the investigation of nature by rational means, in seventeenth and eighteenth century Europe, a period that is often described as “the scientific revolution.” Up until the observations and reasoning of Nicolaus Copernicus and Galileo Galilei, the understanding of nature in Europe was dominated by the physics and metaphysics of Aristotle and, building on Aristotelian foundations, the cosmology of Ptolemy. In the medieval period, Aristotelian science had been skillfully combined with Christian theology, most notably by Thomas Aquinas, and later institutionalized via prescriptive pedagogy in the monastic schools and universities that prepared students for a life in the Church. But during the sixteenth century Reformation, the authority of the Catholic Church as the proper interpreter of Christianity was questioned by members of different Protestant sects. And in the seventeenth century, various aspects of Aristotelian natural philosophy came under sustained attack, leading to a proliferation of alternative theoretical proposals. Though some of these proposals looked back to ancient philosophical theories, such as Stoic vitalism and Epicurean atomism, others took a different approach, stretching from the inductive method of Francis Bacon and experimental method of Robert Boyle to the deductive method of René Descartes and mathematical methods of Galileo Galilei and Isaac Newton. It was then left to David Hume to assess the methods and recommend an empiricist program involving a new understanding of causation, extending from the investigation of the world at large to the investigation of the human mind.

# Course Texts

**M**: Michael R. Matthews (ed.), *The Scientific Background to Modern Philosophy: Selected Readings* (Hackett, 1989)

**H**: David Hume, *An Enquiry Concerning Human Understanding*, Second Edition (Hackett, 1993)

**C**: Canvas website for the course

**Texts (M) and (H) are required and may be purchased through UCSD. Please bring all relevant texts to lecture. For example, if a particular lecture focuses on a particular text, make sure that you have that very text available during lecture in a format that is easy to read (on a computer, tablet, or paper – not on a smart phone).**

**In your papers and assignments, please use and quote from the assigned texts and no other editions or translations.**

# Course Schedule

January 9: Introduction

January 11: Aristotle on Nature, Causes, and the Void

 *Reading*: **M**, pp. 7-19 (*Physics*, Book II, Chapters 1-3; Book IV, Chapter 8)

January 13: Aristotle on the Heavens

 *Reading*: <http://classics.mit.edu/Aristotle/heavens.1.i.html>

 *On the Heavens*, Book I, Parts 2-3 and Parts 8-9

 <http://classics.mit.edu/Aristotle/heavens.2.ii.html>

 *On the Heavens*, Book II, Parts 4 and 6

January 18: Aristotle on the Scientific Method

 *Reading*: **M**, pp. 26-32 (*Posterior Analytics*, Book I, Chapters 1-2 & Chapter 13)

January 20: Copernicus on Heliocentrism

 *Reading*: **M**, pp. 36-44 (excerpts from *The Commentariolus* (1512) and *On the*

 *Revolutions of the Heavenly Spheres* (1543))

 **C**, excerpt from *On the Revolutions of the Heavenly Spheres* (1543)

January 23: Galileo on the Moon(s): The Role of Observation

 *Reading*: **C**, excerpts from *The Sidereal Messenger* (1610)

January 25: Galileo’s Response to Appeals to Authority (Aristotle/the Catholic Church)

 *Reading*: **M**, pp. 61-71 (excerpt from *Dialogues Concerning the Two Chief World*

 *Systems* (1632))

 **C**, excerpt from *Letter to the Grand Duchess* (1615)

 **FIRST ESSAY DUE BEFORE 9am**

January 27: Galileo’s Response to Appeals from Observation: The Tower Argument

*Reading*: **M**, pp. 71-81 (excerpt from *Dialogues Concerning the Two Chief World*

 *Systems* (1632))

January 30: Galileo’s Experimental Method

*Reading*: **M**, pp. 81-86 and

 <https://galileoandeinstein.phys.virginia.edu/lectures/gal_accn96.htm>

 (excerpt from *Discourses Concerning Two New Sciences* (1638))

February 1: Bacon’s Diagnosis of Errors in Scientific Theorizing

 *Reading*: **C**, *New Organon* (1620), Book I, Sections 1-65

February 3: Bacon’s Inductive Method

 *Reading*: **C**, *New Organon* (1620), Book I, Sections 95-130

February 6: Bacon’s Method Applied – the case of Heat

*Reading*:<https://www.google.com/books/edition/Novum_Organum/Xc9xDgHgvaYC?hl=en&gbpv=1&pg=PA1&printsec=frontcover>

*New Organon* (1620), Book II, Sections 11-20 (pp. 121-159)

February 8: Descartes’s Project

 *Reading*: **C**, *Discourse on the Method* (1637), Parts 1-2 and 4-5

<https://grattoncourses.files.wordpress.com/2017/12/rene-descartes-discourse-on-method-and-meditations-on-first-philosophy-4th-ed-hackett-pub-co-1998.pdf>

 **M**, pp. 94-97 (*Principles of Philosophy* (1644), “Letter from the

 Author”)

February 10: Descartes on Matter and Motion

 *Reading*: **C**, *Principles of Philosophy* (1644), Part 2, Sections 1-35

 **C**, *Principles of Philosophy* (1644), Part 3, Sections 1-30

## February 13: Descartes on Laws of Nature and Force

 *Reading*: **C**, *Principles of Philosophy* (1644), Part 2, Sections 36-64

February 15: Spinoza Against Final Causes

 *Reading*: **C**, *Ethics* (1677), Appendix to Part 1

February 17: Boyle’s Corpuscularian Mechanism

 *Reading*: **M**, pp. 109-123 (excerpt from *The Excellency and Grounds of the*

 *Corpuscular or Mechanical Philosophy* (1674))

February 22: Cavendish’s Vitalist Materialism

 *Reading*: **C**, *Observations upon Experimental Philosophy* (1666), “An

 Argumental Discourse”

 **SECOND ESSAY DUE BEFORE 9AM**

February 24: Malebranche’s Occasionalism

 *Reading*: **C**, *The Search After Truth* (1674), Book 6, Part 2, Chapter 3 and

Elucidation 15

February 27: Primary and Secondary Qualities

 *Reading*: **C**, Rickless, “Qualities” (The Theoretical Background: Aristotle)

 **M**, pp. 56-61, Galileo, *The Assayer* (1623)

 Locke, *An Essay Concerning Human Understanding* (1690), Book

II, Chapter 8, Sections 8-26.

<https://oll.libertyfund.org/title/locke-the-works-vol-1-an-essay-concerning-human-understanding-part-1> (Book II, Chapter 8)

March 1: Newton’s Method

 *Reading*: **M**, pp. 137-139 (*Principia*, 1687, *Preface to the First Edition*)

 **M**, pp. 146-153 (Principia, 1687, *Rules of Reasoning in Philosophy* and

*General Scholium*)

 **M**, pp. 153-158 (*Opticks*, 1704, *Query 31*)

March 3: Newton’s Method Applied

 *Reading*: **C**, *Principia* (1687), Definitions

 **C**, *Principia* (1687), Axioms, or The Laws of Motion

 **C**, I. B. Cohen, “Newton’s Discovery of Gravity”

March 6: Hume on Impressions and Ideas

 *Reading*: **H**, Sections 1-3

March 8: Hume on the Problem of Induction

 *Reading*: **H**, Section 4, and Section 5, Part I

March 10: Hume on the Idea of Necessary Connection

 *Reading*: **H**, Section 7

March 13: Hume on Skepticism

 *Reading*: **H**, Section 12

Introduction to *A Treatise of Human Nature* (**C**)

March 15: Shepherd’s Criticisms of Hume on Induction

*Reading*:<https://books.google.com/books?id=EQBfAAAAcAAJ&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false>

*An Essay upon the Relation of Cause and Effect*, pp. 27-68

March 17: Conclusion and Review

# Course Requirements

 **\* Lecture attendance and participation: 5%**

 **\* Section attendance and participation: 5%**

 **\* First paper (due via Canvas before 9am, January 25): 20%**

 **\* Second paper (due via Canvas before 9am, February 22): 30%**

 **\* In-person final exam (March 22, 8am-11am): 40%**

**Attendance at every lecture and section, and doing the required reading (including the course notes) ahead of each lecture, are course requirements. As insurance against missing a lecture or section (for whatever reason), please arrange (ahead of time) to borrow notes from someone else in the course.**

**Each unexcused absence from section will result in the loss of 1/3 of a section attendance/participation grade (e.g., from an A- to a B+). You are permitted to miss two lectures without an excuse without penalty. Each unexcused absence from lecture thereafter will result in the loss of 1/3 of a lecture attendance/participation grade.**

**Paper extensions will only be given to those who present evidence of a valid excuse in a timely manner. Unexcused late papers will receive a grade of F.**

**Valid excuses include incapacitating or contagious illness that is serious enough to justify absence or inability to submit an assignment on time (as established by a doctor’s note), an important family obligation (e.g., a wedding or a funeral) that cannot be rescheduled, an important university obligation (e.g., a tournament where you are representing the university with an already fixed tournament date), or an important religious obligation. An excuse will be considered valid only if you did whatever was physically possible to inform me (and, in the case of a missed section, your TA) as early as possible of your need to be absent. Letting me (or, if applicable, your TA) know of your absence after you knew that you would be absent (unless you were incapacitated and incapable of communicating) constitutes a forfeiture of your right not to suffer grade consequences as a result of your absence. Informing me or your TA of your absence does not automatically provide you with a valid excuse for being absent. In order not to lose points for being absent, your excuse must be valid, and I (Sam Rickless) am the one who will decide whether your excuse is valid.**

**Examples of excuses that are not valid include: oversleeping, missing the bus or other form of public transportation (except in the case of unanticipated emergency, such as an earthquake or widespread flooding that disables the public transportation system), discovering at the last minute that your car is nonfunctional (unless it has been stolen or suffered unanticipated damage for which you are not responsible), relying on a friend or family member to drive you and then discovering at the last moment that the car used by your friend or family member is nonfunctional, needing to take care of a family member who needs constant supervision when there are other family members or family friends available to do so, helping a friend when there are other ways that the friend could be helped, going to a routine (non-emergency) appointment relating to your physical or mental health that could have been scheduled or could be rescheduled at a time that does not conflict with a course requirement, a requirement (e.g., a lab, section, or assignment) for another course, a work obligation.**

**So, as soon as you know that something about your personal situation will cause some sort of conflict with a course requirement, you must inform me (and, in the case of section, your TA) of the conflict.**

**If you need to make an appointment to see me outside of office hours, please do so by contacting me by email with at least two days’ notice.**

# Additional Important Notes

* **Reminder: Regular in-person lecture and section attendance is mandatory. If you have a scheduled commitment (e.g., a lab for another course, a job) that conflicts with the course lectures or course sections, then cancel/change the commitment or drop this class.**
* **The use of any electronic equipment other than a note-taking device or device (other than a cell phone) that displays the assigned course reading during lecture is prohibited. The use of such equipment for any purpose other than note-taking or referring to the assigned course material is also prohibited. Any student who is watching videos, surfing the web, texting, or engaging in any form of activity that is not directly related to this course or poses a risk of distracting other students during lecture will be asked to leave.**
* **Students may not record (audio or video) in this class except in accordance with disability accommodations. Any recordings made in connection with a disability accommodation must be made with my explicit consent and are for the student’s personal academic use only and may not be distributed in any manner to any other individual or to any corporate entity.**
* **The academic honor code must be observed in this course. Plagiarism and cheating will not be tolerated.** **Anyone caught plagiarizing or cheating will receive an automatic F in the course (not just an F on the relevant assignment) and will be referred to the Office of Academic Integrity and the Council of Deans for administrative penalties, which may include suspension or expulsion from UCSD.** **In Canvas, there is a tool that takes you to the Academic Integrity Website for UCSD, where you will find answers to questions you may have about academic integrity at UCSD, including helpful answers to questions about plagiarism. You may also find the website link here (**<https://academicintegrity.ucsd.edu>**).**
* **If you find yourself in need of psychological counseling and you do not already have a counselor, please check in with Counseling and Psychological Services (CAPS):** <https://wellness.ucsd.edu/CAPS/Pages/default.aspx>
* **If you need a letter of accommodation because of a disability, please contact the Office for Students with Disabilities (**<https://osd.ucsd.edu>**) and provide me with the letter as soon as possible (preferably before the first lecture). Concerning the letter, please contact me to arrange a meeting by appointment.**
* **If you need help with your writing, please think of using the following resources:** [**https://writinghub.ucsd.edu**](https://writinghub.ucsd.edu) **,** [**https://oasis.ucsd.edu**](https://oasis.ucsd.edu)