

University of California, San Diego  
**Philosophy 32 Philosophy and the Rise of Modern Science**  
**Winter 2017**

Professor Don Rutherford  
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Class: MWF 11-11:50 pm  
Warren Lecture Hall 2207

### **Description**

In this class, we will study the intersecting developments of philosophy and science in the seventeenth and eighteenth centuries from a variety of perspectives. We will examine how modern science emerges in reaction to Aristotle's theory of nature, the dominant account of the universe during the previous two millennia. We will consider how philosophical issues—concerning space, matter, motion and force—drive scientific inquiry, and how new philosophical theories of knowledge and human nature track the progress of science. And we will investigate the relation of the new science to traditional Biblical religion, noting the points at which the two come into conflict and the efforts made by scientists and philosophers to reconcile their theories with religious doctrines. Our modern world takes shape in the seventeenth century and is significantly defined by the rise of modern science. We will use the lens of philosophy to examine that development and its continuing importance for our understanding of ourselves and the world around us.

### **Required Text**

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

All other readings for the class will be made available via the class TritonEd (=TED) site.

### **Assignments and Grading (total 100 points)**

- Two take-home midterms, each worth 30 points (the first midterm will be distributed on January 29 and will be due at 11:59 pm on February 5; the second exam will be distributed on February 26 and will be due at 11:59 pm on March 5). All exams will be submitted on TED via turnitin.com.
- Weekly, unannounced reading quizzes. Each will be worth 2 points. You may count your best 5 quizzes for a total of 10 points.
- Final examination, worth 30 points; cumulative but concentrating on material from the latter part of the course.
- Both midterms and the final examination must be taken to pass the class. No makeup quizzes or exams will be given.

### **Other Important Information**

- Regular attendance and completion of the required reading ahead of lectures are critical. Engagement with the course presupposes that you have done the assigned reading and are prepared to discuss it in class.
- Use of computers and other electronic devices is allowed in class for legitimate pedagogical purposes, **not for web surfing or personal communications**. When I use slides, I will make them available after class, so there is no reason to try to write down everything on them. In general, you should remain as focused on the content of the lecture as possible.

- If accommodations are needed for a disability or for religious reasons, please discuss the matter with me as soon as possible.
- Extensions will only be given to those who present evidence of a valid excuse in a timely manner. Note that computer or printer failure does **not** usually constitute a valid excuse, so be sure to take all necessary precautions to safeguard your work (backup, backup, backup!). If at any time you believe you have a legitimate claim to an extension, bring it to my attention as soon as possible (e.g., if you are going to be out of town for a legitimate purpose, such as a university-sponsored concert performance, athletic event, conference, or the equivalent). Unexcused late exams will be penalized the equivalent of one +/- letter grade per day.
- Students should familiarize themselves with the UCSD Policy on Integrity of Scholarship: <http://students.ucsd.edu/academics/academic-integrity/policy.html>. There is a zero-tolerance policy on plagiarism in this class. If you are pressed for time or blocked, it is **always** better to talk with me and to take the late penalty if necessary, than to submit work that is not your own. All written work will be submitted to turnitin.com, so there is a very high probability that plagiarism will be detected. Anyone who is found to have plagiarized work will receive an F for the course. Additional disciplinary penalties may be assigned by the UCSD administration. Receipt of this syllabus constitutes an acknowledgement that you are responsible for understanding and acting in accordance with UCSD guidelines on academic integrity.

## Schedule of Classes and Reading Assignments

### UNIT 1 THE SCIENTIFIC REVOLUTION: FROM ARISTOTLE TO GALILEO

#### WEEK 1

- January 9 Introduction
- January 11 Aristotelian Physics  
Reading: Aristotle, excerpts from *Physics*, bks. 2 and 4 (Matthews, 7-19) and *On the Heavens*, bk. 1, parts 2-3 (TED)
- January 13 Scientific Explanation  
Reading: Aristotle, excerpts from *Posterior Analytics* (Matthews, 26-32)

#### Week 2

- January 16 MLK DAY – No Class
- January 18 The Heliocentric System  
Reading: Nicholas Copernicus, excerpts from *Commentariolus* (1512) and *On the Revolution of the Heavenly Spheres* (1543) (Matthews, 36-44)
- January 20 The Scientific Mind  
Reading: Francis Bacon, *New Organon* (1620), Part 1, secs. 1-65 (TED)

#### Week 3

- January 23 Scientific Methods  
Reading: Bacon, *New Organon*, Part 1, sec. 92-117 (TED)
- January 25 Galileo's Challenge to the Catholic Church  
Reading: Galileo Galilei, excerpts from *The Sidereal Messenger* (1610) (TED)
- January 27 Reconciling Science and Religion  
Reading: Galileo, *Letter to the Grand Duchess* (1615) (TED)

- Week 4  
January 30 Galilean Science  
Reading: Galileo, excerpts from *The Assayer* (Matthews, 56-61) and *Two New Sciences* (1638) (Matthews, 81-86)
- February 1 Against Aristotle  
Reading: Galileo, excerpts from *Dialogue concerning the Two Chief World Systems* (1632) (Matthews, 61-71)
- February 3 The Tower Argument  
Reading: Galileo, excerpts from *Dialogue concerning the Two Chief World Systems* (Matthews, 71-81)
- UNIT 2 LAWS, CAUSES AND GOD**
- Week 5  
February 6 Descartes's Project  
Reading: René Descartes, *Discourse on the Method* (1637), parts 1-2, 4-5 (TED); *Principles of Philosophy*, "Letter from the Author" (Matthews, 94-97)
- February 8 Descartes on Matter and Motion  
Reading: Descartes, *Principles of Philosophy* (1637), part 2, secs. 1-35 (TED)
- February 10 Descartes on Laws of Nature and Force  
Reading: Descartes, *Principles*, part 2, secs. 36-64 (TED)
- Week 6  
February 13 Occasionalism  
Reading: Nicolas Malebranche, *Search after Truth* (1674), bk. 6, pt. 2, chs. 3 and Elucidation 15 (excerpt) (TED)
- February 15 Experimental Philosophy  
Reading: Robert Boyle, excerpts from *New Experiments Physico-Mechanical, Touching the Spring of the Air* (1660) (TED)
- February 17 The Meaning of 'Nature'  
Reading: Boyle, *A Free Inquiry into the Vulgarly Received Notion of Nature* (1687), chs. 2 and 4 (TED)
- Week 7  
February 20 President's Day – No class
- February 22 Self-Moving and Self-Knowing Matter  
Reading: Margaret Cavendish, *Observations upon Experimental Philosophy* (1666), chap. 35 (TED)
- February 24 Leibniz's Critique of Cartesian Physics  
Reading: Gottfried Wilhelm Leibniz, *Discourse on Metaphysics* (1686), secs. 17-22; *On Nature Itself* (1698) (TED)
- Week 8  
February 27 The Invention of Modern Physics  
Reading: Isaac Newton, Preface to the *Principia* (1687) (Matthews, 137-9) Definitions and Laws (TED)

- March 1           Space, Time and Force  
Reading: Newton, *Principia*, Scholium (Matthews, 139-46); Part III, "Rules for Reasoning" (Matthews, 146-8)
- March 3           Gravity and the Argument from Design  
Reading: Newton, *Principia* (2nd edition), General Scholium (Matthews, 148-53); *Optiks* (1717), Query 31 (Matthews, 153-8)
- UNIT 3           A SCIENCE OF HUMAN NATURE**
- Week 9
- March 6           Naturalizing Human Beings  
Reading: David Hume, Introduction to *A Treatise of Human Nature* (1739) (TED)
- March 8           Skepticism about Induction  
Reading: *An Enquiry concerning Human Understanding* (1748), sec. 4 (TED)
- March 10          The Basis of Causal Reasoning  
Reading: *An Enquiry concerning Human Understanding*, sec. 5 (TED)
- Week 10
- March 13          Liberty and Necessity  
Reading: Hume, *An Enquiry concerning Human Understanding*, sec. 8 (TED)
- March 15          Animal Reason versus Scientific Reasoning  
Reading: Hume, *Enquiry concerning Human Understanding*, sec. 9 (TED)
- March 17          Summing Up/Review
- Monday, March 20      FINAL EXAM, 11:30 am-2:30 pm