

History 2402: Science and Society: Galileo and Climate Change

PRELIMINARY DRAFT SYLLABUS

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Class: Mondays, Wednesdays 11:40-12:55

Office Hours: Wednesday: 2:00-4:00

Course Description

This course provides an active learning exploration of the intersection of scientific ideas and society in multiple historical contexts. It focuses on: 1) the trial of Galileo by the Roman Inquisition during the early 17th century, which examined the validity and implications of Galileo's ideas on motion physics and astronomy; 2) the 2009 United Nations Climate Change Conference in Copenhagen, which sought an international accord to limit carbon emissions; and 3) a third historical setting, to be chosen by students: either the response to acid rain in Europe in the 1980s; or the problem of obesity, diet, and cholesterol as debated by the CDC, USDA, and Congress during the 1990s. This course will use the Reacting to the Past pedagogy, in which students play complex games, set in the past, their roles informed by classic texts. (For an Introduction to Reacting to the Past, you may wish to visit the following website: <https://reacting.barnard.edu/>. You may wish to look in particular at the section showing videos of Reacting classes.)

"The Trial of Galileo" occupies the first half of the course; Copenhagen and Climate change, and the other game chosen by students, will occupy the second half of the course.

"The Trial of Galileo" will illuminate the collision of the "new science," brilliantly propounded by Galileo Galilei, with the elegant cosmology of Aristotle, Aquinas, and medieval Scholasticism. It examines in greater detail the historical context of Rome--especially the Holy Office, the arm of the papacy that supervised the Roman Inquisition. It also considers the emerging community of scientists under the patronage of Prince Cesi, founder of the Society of the Lynx-Eyed, which promoted the new science, and also the complex role of Jesuit philosophers and mathematicians. Other factors include the ambitions of cardinals within the Vatican--and the Collegio Romana, the power Medici in Florence, the imperial ambitions of the Spanish monarch, and the crisis of faith throughout Christendom. The issues range from the nature of faith and the meaning of the Bible to the scientific principles and methods as advanced by Copernicus, Kepler, Tycho Brahe, Giordano Bruno, and Galileo.

The "Trial of Galileo" will consist of three phases. During the first (or setup phase), the instructor will introduce the central ideas, texts, and historical contexts. During the setup phase, too, every student will be assigned a role, often as a member of a historical faction. The setup will also include several lab sessions, one on optics and the other on stellar parallax. The second phase will consist of the trial, where

students will advance ideas, in their written work and in class, reflecting their positions as outlined in their role packets. The final post-mortem sessions will analyze what happened in history and further explore the ramifications of this intersection of scientific ideas and society in early 17th century Europe.

“Darwin and the Rise of Naturalism” occupies the 2nd half of the course. It recreates the intellectual dynamics that occurred during the meetings of the Royal Society in London, England from 1862-1864. The central debate is whether to award the prestigious Copley Medal for achievement in science to Charles Darwin, whose *On the Origin of Species* was published in 1859. But this matter is bound up with many others, ranging from the role of God in the creation of the world, to the justification for slavery, the need for social reform, the role of women, and the purpose of the state. The central texts include, in addition to Darwin’s *Origin*, excerpts from Francis Bacon’s classic on induction, *Novum Organum*, William Paley’s *Natural Theology* (1802), as updated by the others of the Bridgewater treatises (1833-1840), to the “Book of Common Prayer” of the Anglican Church.

This part of the course will also consist of three phases. During the setup phase, the instructor will introduce the central ideas, texts, and historical contexts. Students will again be assigned roles as members of the Royal Society. The game phase will consist of meetings of the Royal Society, which will debate various issues, though most will relate in some way to Darwin’s scientific method and his *Origin of Species*. The post-mortem phase will reflect on the issues developed in the game and on the intersection of scientific ideas and society more generally.

The final exam will survey the major ideas developed during the course.

Requirements

New requirements:

Four essays, each of 5 pages: 60% of grade

Class participation: Informed participation in class 30% grade

Final Exam plus “reflection paper” 10% of grade

Completion of Labs and Reports (to be determined)

"Required" Readings Available at Book Culture or Columbia University Bookstores

The following books will be read nearly in their entirety, and they are available in paperback. Be sure to get THESE ISBNs, and not earlier editions.

Michael Pettersen, et al *The Trial of Galileo* (Norton) ISBN 9780393937343

Marsha Driscoll, et al, *Charles Darwin, the Copley Medal, and the Rise of Naturalism* (Norton)
ISBN 9780393937268

Charles Darwin, *The Origin of Species* (Norton) ISBN 9780393978674

Schedule of Classes

Part I: The Trial of Galileo

1. January 17 (W): Introduction to the Course

2. January 22 (M): Setup 1: Intellectual Foundations

Read: Pettersen, *Trial of Galileo*, including readings by Aristotle, pp. 3-83. Study "Study Questions" pp. 82-83

3. January 24 (W) Setup 2: Enter Galileo

Roles will be distributed in class

Read: Pettersen, Appendix C: "Decrees by the Council of Trent" and Galileo's *Starry Messenger*, pp. 84-108

Recommended: *Thomas Aquinas, (Thomas McDermott, ed.) Aquinas: Selected Philosophical Writings: Part I: Structures of Thought, Passage 1: "Natural Science, Mathematics, and Metaphysics," pp. 1-51*

The Council of Trent, "Decree 786: On the Interpretation of Scripture" ;

Various sections of the Bible.

4. January 29 (M) Setup 3: Faction Meetings: Discussion of Historical context

Read: Pettersen, Appendix E: Galileo, "Letter to the Grand Duchess Christina", pp. 109-126

5. January 31 (W) Phase One: 1616: **Faction Quiz** (entire gamebook): Indeterminates distributed randomly among factions

6. February 5 (M) **Game Session 1**

Lectures at the College of Rome

Recommended readings: *"The Early Inquisition Proceedings," (Chapter 5) in Finocchiaro, Galileo Affair, pp. 134-153.*

7. February 7 (W) **Game Session 2 First meeting: Holy Office**

8. February 12 (M) **Game Session 2B (Holy Office: Continued)**

9. February 14 (W) **Game Session 3**

Party at Prince Cesi's Palace

Recommended Readings: David Freedberg, *The Eye of the Lynx: Galileo, His Friends, and the Beginnings of Modern Natural History* (2002), pp. 1-141;

10. February 19 (M) **Game Session 4 (Preliminary)**

Session at Holy Office

11. February 21 (W) **Game Session 4 (Continued)**

Session at Holy Office: Final Deliberations and Vote

12. February 26 (M) **Game Session 5 (1616): Election of New Pope [End of Phase 1]**

TIME PASSES: Communique from Instructor concerning changes from 1616-1632. Role modifications distributed.

Recommended Readings: "Diplomatic Correspondence," in Finocchiaro, Galileo Affair pp. 227-255

Pietro Redondi (trans. Raymond Rosenthal), *Galileo Heretic* (1987), pp. 3-271

13. February 28 (W) **Beginning of PHASE II: Game Session 6: 1632**

Holy Office (1632)

14. March 5 (M) **Lab 2: On Stellar Parallax**

Read: Appendix G: Lab 2: Parallax. Lab leaders should work through lab in advance of class, with help of faction. During class, lab leaders will guide faction through lab. Lab leaders should bring a meter stick, a sharp pencil, a protractor, scissors and adhesive tape, and a calculator with a *tan* function.

Additional readings to be assigned.

15. March 7 (W) **Game session 7: 1632**

Holy Office:

SPRING BREAK: March 10-17

16. March 19 (M): **Game session 8: 1632: END**

Additional readings to be assigned.

Part II: Charles Darwin, the Copley Medal, and the Rise of Naturalism, 1861-1864

The readings for Part II will be assigned prior to that section of the course, though students will have to read all of Darwin's *Origin of Species* and of Marsha Driscoll, et al, *Charles Darwin, the Copley Medal, and the Rise of Naturalism, 1861-1864*

17. March 21 (W): Introduction and Role Assignments: Malthus to Marx: And a video
18. March 26 (M): Huxley-Wilberforce Film/Faction Meetings/Quiz
19. March 28 (W): Session 1: Prince Albert's Obituary; Huxley's Efficacy of Prayer Resolution
20. April 2 (M): Session 2: Hooker's Overview of Natural Selection / Nature of Science
21. April 4 (W): Session 3: *Essays & Reviews*, "Student's Declaration"/Resolution of Support for authors of *Essays and Reviews*
22. April 9 (M): Session 4: Scientific Views on Race and Society/ Condemnation of Anthropological Society
23. April 11 (W): Session 5: Women/Public Health/etc
24. April 16 (M): Session 5: Continued
25. April 18 (W): Copley Nominations
26. April 23 (M): Vote
27. April 25 (W): Anniversary Meeting
28. April 30 (M): Post-Mortem; Roles and materials assigned for Final Exam game