

Department of the History of Science, UW-Madison (Spring 2012)

Galileo Galilei: Life, Writings, and Interpretations
Professor Michael H. Shank
Writing Fellow Hueylie Lin

The classroom format combines lectures with discussion. The course is also writing-intensive, with the assistance of Writing Fellow Hueylie Lin on two writing projects, an analytical paper and the midterm essay.

Meetings: MW 4-5:15 pm in 224 Ingraham

Contact information:

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Required Books

John Heilbron, Galileo (Oxford: Oxford University Press, 2010).

Galileo on the World Systems: A New Abridged Translation and Guide, trans. and ed. by Maurice Finocchiaro (Berkeley: U. of California Press, 1997).

Maurice Finocchiaro, The Essential Galileo (Hackett, 2008).

Maurice Finocchiaro, ed., The Galileo Affair (Berkeley: U. of California Press, 1989).

Richard J. Blackwell, Galileo, Bellarmine, and the Bible (Notre Dame: U. of Notre Dame Press, 1987).

Dava Sobel, Galileo's Daughter: A Historical Memoir of Science, Faith, and Love (New York: Penguin, 1999).

Ernan McMullin, ed., The Church and Galileo (Notre Dame: U. of Notre Dame Press 2005).

The Course Reader is available for download at Learn@UW (a hard copy—strongly encouraged—can be printed on demand, at Bob's Copy Shop @ Charter and Monroe, more cheaply than on your printer). In addition, there may be an occasional additional chapter to be read (hopefully some draft chapters of my forthcoming book project).

FYI, although some of these books have a modest duplication of primary sources, this combination of materials is cheaper than the older list I traditionally assigned.

A good reference for the conceptual history of physics and astronomy during the Scientific Revolution is I. Bernard Cohen, The Birth of a New Physics (Norton). A reliable website is The Galileo Project (started by Al van Helden) at Rice University:
<http://es.rice.edu/ES/humsoc/Galileo/>

Requirements/Evaluation

Beginning with week 3, reading the assigned selections before class is very important, as is oral participation by way of informed questions and comments.

Thanks to the UW's excellent Writing Fellow Program, your writing and revisions of one analytical paper and the midterm will profit from the editorial skills and advice of Hueylie Lin. Her assistance is a guarantee not of an A, but of better writing overall, particularly in the areas of clarity, organization, and effectiveness (not matters of content). The process, involving comments, revision, and short conference, is not unlike that in place in many work situations, where writing is cooperative, includes feedback and responds to comments. Take advantage of this opportunity.

A one-page evaluative and analytical "reader's response" paper will be due in class for almost every week in which you are handing in no other writing assignment. This short

assignment is meant (1) to stimulate your thinking and your ability to contribute to the discussion; (2) to give me feedback on areas that you find problematic; (3) to keep you thinking and writing (the two activities go together). These papers will be marked sat/unsat; after the first few weeks, they may not always be edited heavily or returned every week). For all of the preceding reasons and to keep up the rhythm, I strongly encourage you to write one for yourself even when they are not due. For instructions, see appendix to syllabus.

In-class participation and one-page "reader's response" papers (20%), the latter due in class by Wednesday at the latest.

One of the two analytical papers listed in week 1 (5 pp.): 15% . This paper will go first to your Writing Fellow, be revised, and then be turned in to me.

One of the analytical papers listed in weeks 7, 9, 10, or 11 (ca. 5 pp.): 15% each (due at the beginning of the relevant class period in every week in which no analytical paper or review is due)—Additional analyses earn extra-credit (15% each).

Take-home midterm essay (20%). This paper will go first to your Writing Fellow, be revised, and then turned in to me.

Review of Dava Sobel, Galileo's Daughter (5 pp.): 15%.

Final take-home essay (choice of questions; 20%) and short in-class final exam from review sheet of key concepts (10%)

For other extra-credit options and/or honors projects (e.g., observation projects, in-class reports, as well more traditional work), see Shank.

The UW-Madison is committed to creating a dynamic, diverse and welcoming learning environment for all students and has a non-discrimination policy that reflects this philosophy. Disrespectful behaviors or comments addressed towards any group or individual, regardless of race/ethnicity, gender, sexuality, religion, ability, or any other difference are unacceptable in this class.

Note, however, that I have no tolerance for plagiarism or any other form of academic dishonesty, from unattributed borrowings through cheating to the purchase or resubmission of others' papers. I encourage genuine collaboration, but all submitted work for this course must start as your work, develop as your work, and be your work when submitted. You must place the phrases of others in quotation marks and credit their ideas. If you are unsure about proper citation practice, look at Wayne Booth *et al.*, The Craft of Research (Chicago, 1995) or the latest edition of the Chicago Manual of Style. If questions remain, contact me (in person, by phone, or by email). When I have found academic dishonesty, I have sought the harshest sanctions available, including expulsion of the guilty from the university without a degree. If you are unsure about proper citation practice, talk to me about it (in person, by phone, or by email).

Reference: note the chronology in The Essential Galileo, pp. 17ff; The Galileo Affair, pp. 297-312, and the helpful glossary of terms and names from the cast of characters in The Essential Galileo, pp. 26ff; The Galileo Affair, pp. 313-324; and Heilbron, Galileo, pp. 366-88.

Schedule

Week 1: Introduction to course/sixteenth-century background

M 1/23: Introduction to the course; beginning of early astronomy

W 1/25: Introduction to early astronomy and its context

Choose and read one of the two text options for the analytical paper: Either the Dedication of "Starry Messenger," in Finocchiaro, The Essential Galileo, pp. 45-48 or the "Letter to Castelli" (1613), in Blackwell (pp. 195-201) or Finocchiaro, The Essential Galileo, ch. 4, pp. 103-09 (see week 5).

Begin reading for next week and also Sobel for narrative of biography (take good notes—we will discuss the book in Weeks 8ff))

Recommended for general background (in multiple UW libraries and HistSci Reading Room): Thomas Kuhn, The Copernican Revolution, ch. 1-4; I. B. Cohen, The Birth of A New Physics; short: Stillman Drake, Galileo Galilei (Oxford/Hill and Wang); Ludovico Geymonat, Galileo Galilei: A Biography and Inquiry into his Philosophy of Science.

Week 2: The early Galileo and his context

M 1/30: Drake, "Vincenzio Galilei and Galileo," Galileo Studies, pp. 43-62 (Reader pp. 3ff); Tim Carter, "Music and Patronage in Late Sixteenth-Century Florence: The Case of Jacopo Corsi, (1561-1602)" in I Tatti Studies: Essays in the Renaissance 1 (1985) 57-79 (**skim** notes and appendices; Reader, pp. 15ff); Lerner, "The Heliocentric 'Heresy'," pp. 11-18 (first part) and Shank, "Setting the Stage," (first part) in McMullin, ed., The Church and Galileo, pp. 57-69.

W 2/1: **Analytical paper #1 due in class (to Writing Fellow Hueylie Lin)**

Blackwell, Galileo, Bellarmine, ch. 1, Appendices 1-3, pp. 5-27, 181-194; Heilbron, Galileo, ch. 1-2, pp. 1-63.

Week 3: The Science of motion to the early Galileo

M 2/6 Lindberg, Beginnings of Western Science, pp. 290-307 (Reader, pp. 55ff); Heilbron, Galileo, ch. 3, pp. 64-09.

W 2/8: Heilbron, Galileo, ch. 4, pp. 110-42; "Comrades in Pursuit of Truth," pp. 597-600 (Reader pp. 111ff); Koyré, "Galileo and Plato," from his Metaphysics and Measurement (Harvard UP, 1968), 16-43 (Reader, pp. 41ff).

One-pager due.

Week 4: Galileo and the spyglass, 1610

M 2/13: Finocchiaro, The Essential Galileo, ch. 1, pp. 45-84; Heilbron, Galileo, ch. 5, pp. 143-199.

W 2/15: Westfall, "Scientific Patronage: Galileo and the Telescope," Isis 76 (1985) 11-30; Biagioli, "Galileo the Emblem-maker," Isis 81 (1990) 230-258; Shank, "Galileo's Day in Court," Journal for the History of Astronomy 25 (1994) 236-242 (Reader, pp. 65ff, 77ff);

One-pager due.

Week 5: Galilean controversies, 1612-13

M 2/20: Finocchiaro, The Essential Galileo, ch 2-3, 85-102; **Supplement with photocopies** ; Heilbron, Galileo, ch. 6.1, pp. 200-223.

W 2/22: Castelli's 1613 letter to Galileo (from Finocchiaro, Galileo Affair, pp. 47-48); "Letter to Castelli" (1613), in Blackwell (pp. 195-201) or Finocchiaro, The Essential Galileo, ch. 4, pp. 103-09; Blackwell, chap. 3; Kelter, "Refusal to Accommodate," in McMullin, ed., The Church and Galileo, pp. 39-53.

Revised first analytical paper due in class.

Week 6: Natural philosophy and religious knowledge

W 2/27: Blackwell, ch. 2-3, pp. 29-85; McMullin, "Galileo's Theological Venture," in McMullin, ed., The Church and Galileo, ch. 4, pp. 88-116.

M 2/29: Blackwell, chap. 4, pp. 87-110; and Appendices 5-9, pp. 203-276 (includes Foscarini's Lettera)

Serious work on midterm so that you can also be ready for the discussion and for handing in the midterm on Monday 3/5

Week 7: Galileo admonished, 1616

M 3/5: **Read for discussion** "Letter to Grand Duchess Christina" in Finocchiaro, The Essential Galileo pp. 109-45; Heilbron, Galileo, ch. 6.1, pp. 200-23.

Possible analytical paper on the "Letter to the Grand Duchess," in Finocchiaro, The Essential Galileo, pp. 113 ("Now...") to 117 ("...necessary demonstrations." 4 lines from the bottom).

W 3/7: Finocchiaro, The Essential Galileo, ch. 6 (Earlier Inquisition Proceedings), pp. 168-178; "The Discourse on tides (1616)" and "Correction of Copernicus" in Finocchiaro, The Galileo Affair, pp. 119-133 and 198-202; Blackwell, chap. 5, pp. 111-134; Fantoli, Part 1 of "The Disputed Injunction" (pp. 117-26) and McMullin, "The Church's Ban on Copernicanism, 1616," both in McMullin, ed., The Church and Galileo, pp. 150-90.

Midterm essay due to Writing Fellow Hueylie Lin.

Week 8: From Galileo on comets to the papacy of Urban VIII

M 3/12: Galileo, "Letter to Archduke Leopold," (1618) and Corrections of Copernicus (from Finocchiaro, The Galileo Affair, pp. 198-202); excerpts from The Assayer in Finocchiaro, The Essential Galileo, ch. 7, 179-89; Heilbron, Galileo, ch. 6.2-6.3, pp. 224-52.

W 3/14: Discussion of Sobel, Galileo's Daughter, Parts 1-2 (to p. 183)—take good notes (review due later!)--how does her interpretation differ from that of other historians we are reading? Is she "just" telling a story? Does she have one thesis? Several? Namely?

Week 9: Galileo's Dialogue (1632)--Days I & II:

Change in the heavens? Possible Rotation of Earth?

M 3/19: Heilbron, Galileo, ch. 7 (part 1), pp. 268-317; Galileo on World Systems, "To the Discerning Reader," and Day One, pp. 77-116 including the explanatory notes; Heilbron, Galileo, ch. 8 (part 1), pp. 318-36.

W 3/21: Galileo on World Systems, Day Two, pp. 117-170 including the explanatory notes. One-pager due, or analytical paper: Day 2, fourth argument, pp. 155-165 ("...say something.")

Week 10: Galileo's Dialogue (1632)-Day III:

Might the Earth revolve around the Sun?

M 3/26: Galileo on World Systems, Day Three, pp. 221-81.

Possible analytical paper: Day 3, pp. 221-234.

W 3/28: Sobel, Parts 3-4 **or revised midterm (email me)** TBA

Spring Break: 3/31-4/8

Week 11: Galileo's Dialogue (1632) III—What do the tides tell us?

M 4/9: Galileo on World Systems, Day Four, pp. 282-308 including the explanatory notes; Heilbron, Galileo, ch. 8 (part), pp. 340-44.

Possible analytical paper: Day 4, pp. 282-93, ("...various phenomena.")

W 4/11: Shank Draft of New Chapter? (handout); finish Shank, "Setting the Stage," in

McMullin ed., The Church and Galileo, pp. 69-81; D. P. Walker, Spiritual and Demonic Magic from Ficino to Campanella (Notre Dame, 1958; 1969), pp. 203-212 (Reader, pp. 139ff); Heilbron, Galileo, ch. 7.3 (part 1), pp. 285-317.

One-pager due.

Week 12: The Aftermath Galileo's Dialogue

M 4/16: Sobel, Parts 5-6 (review due at beginning of class on Monday).

W 4/18: Beretta, "The Documents in Galileo's Trial," in McMullin, ed., The Church and Galileo, ch. 7, pp. 191-212; Trial documents in Finocchiaro, ed., The Galileo Affair, pp. 206-255.

Week 13: Galileo and the Roman Inquisition (1633)

M 4/23: Finocchiaro, ed., The Galileo Affair, pp. 256-293 [more comprehensive than Finocchiaro, The Essential Galileo, ch. 9, pp. 272-94]; browse Fantoli, Part 2 of "The Disputed Injunction" in McMullin, ed., The Church and Galileo, pp. 126-43.

W 4/25: Heilbron, "Censorship of Astronomy...." in McMullin, ed., The Church and Galileo, ch. 11, pp. 279-322; Stéphane Garcia, "Galileo's Relapse: On the Publication of the Letter to the Grand Duchess Christina," in McMullin, ed., The Church and Galileo, ch. 10 (pp. 265-78).

One-pager due.

Week 14: Galileo's mature mechanics

M 4/30: Cohen, "Toward an Inertial Physics;" (Reader, pp. 115ff); Galileo Galilei, Two New Sciences, Days 1-2 in Finocchiaro, The Essential Galileo, pp. 295-334; Heilbron, Galileo, ch. 8 (part 1), pp. 318-36.

W 5/2: Galileo Galilei, Two New Sciences, Days 3-4 in Finocchiaro, The Essential Galileo, pp. 334-67; Heilbron, Galileo, ch. 8 (part 2), pp. 336-44.

One-pager due.

Week 15: Galileo as myth and history

M 5/7: Galileo and Instrumentation; Heilbron, Galileo, ch. 8 (end), pp. 344-66.

W 5/9: The scope of the course and its implications

Final Exam: Saturday May 19, 2012 @7:45 a.m!!

Galileo course: Guidelines for the one-page papers

The following guidelines seek to clarify my expectations for the one-page response paper and amplify what I said about them orally.

The purposes of these papers are several:

- 1) to help you read the assignments carefully, critically, and in advance;
- 2) to help you commit yourself in writing to a point of view on a topic worthy of discussion in class (i.e., this is a resource for your class participation)
- 3) to get beneath the surface of the assigned texts by ferreting out/analyzing/amplifying an issue/theme or two that you consider significant.

I hope that, as a matter of course, you are drawing connections between the texts we are reading and the rest of your knowledge. In these papers, however, I expect you to **focus on the readings** and to be analytical and critical when reflecting on them. By

“analytical,” I mean that you are thinking about the way in which the author is constructing an argument, trying to persuade a reader, or refuting an opponent. You are paying attention to the parts of the arguments, to the strategies of the writer, and to their effectiveness. By “critical,” I do not mean “disapproving” or “negative,” but rather the attempt to get under the surface of a text and beyond the appearances.

Here are a few examples of what you might do. Think about what the text reveals (or hides), including the text’s hidden assumptions. Think about successful as well as flawed arguments. Think about the author’s intended audience (and perhaps his unintended ones as well). Think about the possible differences between what we see in a source, and what a contemporary of Galileo might have seen in it. If you find a line of reasoning persuasive, ask yourself why it persuades you (similarly for the unpersuasive). Read between the lines, and give reasons for your reading. The preceding advice goes for both primary materials (the writings of Galileo and his contemporaries) and, when applicable, to secondary sources as well (the writings of historians and other interpreters).

Your focus may be a significant point of detail, or the larger thesis of one of the reading assignments, or a variety of issues between these extremes. While this choice is a matter of taste, I suggest that, when in doubt, you go for the specific (and therefore more manageable) rather than the general point. The one-page requirement effectively makes it impossible for you to defend a grand thesis convincingly. This is not a dissertation.

You miss the point of the assignment if you hand in either a mere summary of points, or what you take to be obvious points, or if you editorialize about current issues or stimuli to your memory (“Galileo’s point reminds me of an anecdote about science and religion that my high school history teacher used to tell...”). I am very interested in seeing you explain your excitement about a new insight into the seventeenth century, deal with something unexpected, confront a puzzle, or articulate a problem clearly (even one that you cannot yet solve). Setting up a problem clearly is often the most valuable contribution to a future solution. Admissions of ignorance are fine, but you should follow them with signs of intellectual struggle—e.g., attempted solutions, and reasons why they do not seem satisfactory. I hope that, on more than one occasion, the readings for a later week will help you solve the puzzle of an earlier week’s assignment. I am happy to hear about such insights; if they tie in to the current week’s readings, they are appropriate topics for the current week’s one-page paper as well.

It should be obvious that these skills will serve you well in many future endeavors that have nothing to do with Galileo, from the reading of contracts to the analysis of news reports to the decoding of love letters, to say nothing of the readings in your other courses.

Let me know (in class or via mhshank@wisc.edu) if you have remaining questions.

Guidelines for the Analytical Papers

The following guidelines are intended to give you a rough idea of my expectations. They (the guidelines, that is) may not apply in every detail to each assignment.

1. These assignments are meant to be analytical and expository, not research papers. The focus is on analyzing and understanding as much as possible about the assigned passage. I do not expect you to use much more than the text itself (the rest of the assigned text--passages not analyzed--may, of course, be helpful; other assigned readings may prove useful as well). Again: this is not a research paper.

2. The focus here is on understanding the author, and clarifying the text from the author's point of view. The analysis should not be critical from an anachronistic 20th century point of view ("How stupid of X to say Y since every school child now knows..."). Rather you should try to get inside the author's head, and outline/summarize/clarify in your own words the ideas and emphases expressed in the text. Ideally, your attitude is one of sympathetic understanding (as opposed to destructive criticism). Criticism will enter your analysis when it is a matter of understanding the problems that the text raises. You will have the right attitude if you think of yourself as guiding through the text someone who is interested in the passage but has not read it: it is your job to provide insights into the content of the passage and the problems it raises.

You should at least *think about* the following questions (although you may decide not to address them all directly in your write-up):

*Author's purpose: what main point(s) is the author trying to make in the passage? Some selections will have one primary purpose; others, several. Some will have greater unity than others (the passage is an excerpt).

*Who/what is the author's audience? This is often a crucial question when figuring out the significance of a text.

*Structure of the selection: how has the author organized the case presented here? What comes first? what comes last? Why? Is the author building? tearing down?

*Key ideas/arguments: what are they? how are they presented? defended?

*Difficulties: what points are obscure? poorly explained? poorly defended? unintelligible? If there are apparent inconsistencies, are they apparent only? are they due to hidden assumptions? if so, can you draw the latter out? The recognition of problems/difficulties in your own understanding of a text is an important part of analysis--it is sometimes frustrating, but can also be exhilarating (when you manage to "crack" a problem). Identifying a problem, even if you cannot solve it, is a contribution to analysis

*Author's "success": does the author manage to convince the contemporary reader? how effective are the arguments used? Your criteria of evaluation should be appropriate to the time period and author's purpose.

*When writing, try to be clear and direct (rather than allusive or subtle--you're supposed to get behind/dissect the author's allusions or subtleties). Expository writing is one specific genre of writing (this is not creative writing or poetry).

***At all cost, avoid waiting to read the selection until the night before the analysis is due.** The assignment requires thought. Our brains work while we sleep, but they tend to simmer rather than boil--and simmering requires time.

3. Presentation:

After identifying the main points/purposes of the selection, you may wish to follow the structure of the text when presenting your analysis. This is the most straightforward way of providing an exposition. A clever or flowery introduction is not necessary

In this kind of work, avoid quotations; use restatement and paraphrase instead (the point of the assignment is to grapple with the author's viewpoint by presenting it in your own words--making the effort to do this leads to questions and interesting problems). Quotations tend to short-circuit the process by assuming that the text speaks for itself, which is just the sort of assumption that the assignment wants to avoid. I am not suggesting that you eliminate quotations marks, of course. Paraphrases must be your own. If a quotation is absolutely necessary, keep it very short.

Use any convenient reference system, as needed (Chicago Manual of Style, Turabian, etc.)