2528 Galileo

Course instructor.
Dr. Paolo Palmieri. Office: HPS, 1017 CL. Office hours: T 11-12, W 12-13.

Course description.
The Seminar will focus on Galileo's mechanics, especially the developments from the early theories of *De Motu* (ca. 1590) to *Two New Sciences* (1638). In addition, we will look at Galileo's matter theory in relation to his atomistic natural philosophy. Finally, we will consider the case of Galileo's Copernicanism and the church. We will place Galileo in the context of the late Renaissance and read both primary sources and recent essays which have appeared on these topics.

Course structure.
TERM ESSAY.
This course is open to your research interests. This means that you can propose a project according to them. So providing that your proposal is related to Galileo you are welcome to write a term essay that fits your research interests.

CLASS
One meeting of 2h and 30m per week. Classes will consist of your presentations and discussion, both of them based on the readings and your projects. Topics and corresponding readings are given in the schedule below.

READINGS
Details of readings are given in the schedule below. Some of them are core readings and may not be changed (unless specific circumstances arise concerning your projects). These are compulsory readings. The others are subsidiary readings and might be replaced for presentation purposes. But in this case you should choose presentation type II (see below). Subsidiary readings are not compulsory, but you are strongly encouraged to read as much as possible.

PRESENTATIONS
Presentations are compulsory. They are related to the readings and to your projects. You must prepare a scheme of your presentation, which should be word processed, so that anyone can follow your presentation better. A copy of the scheme must be handed out to all of us. Make sure you write your name, date, and type of presentation clearly.

I suggest three **formats of presentations.**

- **Type I.** Presentations related to core readings. They may take different forms according to your preferences. For example, you may simply give a summary of the reading's contents. You may focus on a particular problem and discuss. However, you should always leave the impression that you have well digested the core reading.

- **Type II**. Presentations related to both core and subsidiary readings. First you need to present the substance of the core reading. Secondly you may focus on a subsidiary reading (or more than one) and discuss the arguments of its author(s). You may wish to propose counter-arguments. Not all readings may lend themselves to this option. You have to decide according to your judgement. Obviously type II presentations are more demanding, therefore you will get an assessment bonus.
- **Type III**. Presentations related to your essay. Depending on the stage of development of your essay you might present a summary of its contents, or focus on subsections. But feel free to explore other possibilities. Note also that it is always a good idea to look at the broader implications of your project.

I will leave the **calendar** of presentations for you to manage.

ASSESSMENT

Assessment is as follows. The final grade is the weighed result of

a) presentations (35%),
b) term paper (65%),

The final essay can be devoted to any topic discussed in the course. Feel free to propose topics that you find more interesting. Guidelines for writing the final essay are given below. The final essay, which must be word processed, is due on **Wed 16 April 2003**. This date may not be missed (should exceptional circumstances arise, such as illness, please get in touch with me as soon as possible).

course SCHEDULE

READINGS

TEXTS (available at the university bookstore)

- Galilei, Galileo. *Dialogue Concerning the Two Chief World Systems*. Trans. by Stillman Drake. New York: Modern Library, 2001. (**WS**)
- Galilei, Galileo. *Two New Sciences and Drake's History of Free Fall*. Trans. by Stillman Drake. Toronto: Wall & Emerson, 2000. (**NS**)

Abbreviations (photocopies are available of all readings except WS and NS):

- DM= Galileo Galilei. *On Motion and Mechanics*. Trans. by I. E. Drabkin & S. Drake. Madison: The University of Wisconsin Press, 1960.
- WS= Galileo Galilei. *Dialogue Concerning the Two Chief World Systems*. Trans. by Stillman Drake. New York: Modern Library, 2001.
- NS= Galileo Galilei. *Two New Sciences and Drake's History of Free Fall*. Trans. by Stillman Drake. Toronto: Wall & Emerson, 2000.
- Sidereus Nuncius 25-57= Galileo Galilei. *Sidereus Nuncius or the Sidereal Messenger*. Trans. by Albert Van Helden. Chicago and London: The University of Chicago Press, 1989, pp. 25-57.
- Sachs 1-30= Joe Sachs. *Aristotle's* Physics. *A Guided Study*. New Brunswick and London: Rutgers University Press, 1998, pp. 1-30.
- Drake's *The evolution of De Motu* = Stillman Drake. *Essays on Galileo and the History and Philosophy of Science*. Ed. by N. M. Swerdlow and T. H. Levere. 3 vols. Toronto: University of Toronto Press, I, pp. 201-235.
- Aristotle's *Physics* VIII, 8= Joe Sachs. *Aristotle's* Physics. *A Guided Study*. New Brunswick and London: Rutgers University Press, 1998, pp. 215-221.
- Wallace's *Causes and Forces*= William Wallace. "Cause and Forces in Sixteenth-Century Physics". *Isis* 69 (1978), pp. 400-412.
- Coimbra commentary in Latin (the text will be provided with a translation)
- Edgerton 225-232= Y. Edgerton. "Galileo, Florentine *Disegno* and the 'Strange Spottednesse' of the Moon". *Art Journal* 44 (1984), pp.225-232.
- *The Virgin and the Telescope* 463-483= Sara Booth & Albert Van Helden. "The Virgin and the Telescope: The Moons of Cigoli and Galileo". *Science in Context* 13 (2000), pp.463-486.
- Drake's *The organizing theme of the Dialogue* = Stillman Drake. *Essays on Galileo and the History and Philosophy of Science*. Ed. by N. M. Swerdlow and T. H. Levere. 3 vols. Toronto: University of Toronto Press, II, pp.23-37.
- Drake's *Reexamining Galileo's Dialogue* = Stillman Drake. *Essays on Galileo and the History and Philosophy of Science*. Ed. by N. M. Swerdlow and T. H. Levere. 3 vols. Toronto: University of Toronto Press, II, pp.38-57.
- Lattis 106-144= James M. Lattis. *Between Copernicus and Galileo. Christoph Clavius and the Collapse of Ptolemaic Cosmology*. Chicago and London: The University of Chicago Press, 1994, pp. 106-144.
- Lattis 180-216= James M. Lattis. *Between Copernicus and Galileo. Christoph Clavius and the Collapse of Ptolemaic Cosmology*. Chicago and London: The University of Chicago Press, 1994, pp. 180-216.
- Finocchiaro - Documents= Maurice Finocchiaro [Ed.] *The Galileo Affair. A Documentary History*. Berkeley, Los Angeles, London: The University of California Press, 1989, pp. 256-293.
- Finocchiaro *Letter to Christine*= Maurice Finocchiaro [Ed.] *The Galileo Affair. A Documentary History*. Berkeley, Los Angeles, London: The University of California Press, 1989, pp. 87-118.
- Redondi's Galileo Heretic= Pietro Redondi. *Galileo Heretic*. Princeton: Princeton University Press, 1987, pp.9-27; 137-175.
- Carroll's Galileo and the Bible= William E. Carroll. "Galileo and the Interpretation of the Bible". *Science & Education* 8 (1999), pp. 151-187.
- Palmerino= Carla Rita Palmerino. "Galileo's and Gassendi's Solutions to the Rota Aristotelis Paradox: A Bridge between Matter and Motion Theories". In: J.E. Murdoch, W.R. Newman, C.H. Lüthy (Eds.) *Medieval and Early Modern Corpuscular Matter Theories*. Leiden: Brill, 2001, pp. 381-422.
- Dijksterhuis= E. J. Dijksterhuis *The Mechanization of the World Picture*. London: Oxford University Press, 1961, pp.418-424.
- Drake's *History of free-fall* (in NS)
- Drake's pioneer 99-115= Stillman Drake. *Galileo: Pioneer Scientist*. Toronto: University of Toronto Press, 1990, pp. 99-115.
- Shea 16-44= William Shea. *Galileo's Intellectual Revolution*. London: The Macmillan Press, 1972, pp. 16-44.
- Biagioli 159-209= Mario Biagioli. *Galileo, Courtier*. Chicago and London: The University of Chicago Press, pp. 159-209.

TIME TABLE

DATE	WEEK	TOPIC	READINGS core	READINGS subsidiary
8 Jan	Week 1	Course introduction		
15 Jan	Week 2	De Motu 1 heavy and light and the Aristotelian context	DM 3-12; 13-26	• Sachs 1-30 • Drake's *The evolution of De Motu* • Wallace's *Causes and Forces*
22 Jan	Week 3	De Motu 2 punctum reflexionis	• DM 26-38; 94-100 • Coimbra commentary	• Sachs 1-30 • Aristotle's *Physics* VIII, 8 • Wallace's *Causes and Forces*
29 Jan	Week 4	The ragged moon	Sidereus Nuncius 25-57	• Edgerton 225-232 • *The Virgin and the Telescope* 463-483
5 Feb	Week 5	Infinite degrees of speed	WS, I, 9-32	Drake's *Reexamining Galileo's Dialogue*
12 Feb	Week 6	Incorruptible vs. corruptible	WS, I, 71-121	• Lattis 106-144 • Lattis 180-216
19 Feb	Week 7	Ptolemy's argument	WS, II, 218-236	• Lattis 106-144 • Lattis 180-216
26 Feb	Week 8	The flux and reflux of the sea	WS *Fourth Day*	Drake's *The organizing theme of the Dialogue*
12 Mar	Week 9	Galileo and the Church 1	Finocchiaro *Letter to Christine*	Carroll's Galileo and the Bible
19 Mar	Week 10	Galileo and the Church 2	Finocchiaro - Documents	Redondi's Galileo Heretic
26 Mar	Week 11	Rota Aristotelis	NS, I, 26-34	• Palmerino • Dijksterhuis
2 Apr	Week 12	Matter and motion	NS, I, 64-75	• Dijksterhuis • Redondi's Galileo Heretic
9 Apr	Week 13	Free-fall law	NS, III, 147-167	Drake's *History of free-fall*
16 Apr	Week 14	Parabolic trajectory	NS, IV, 217-229	Drake's pioneer 99-115
23 Apr	Week 15	Galileo and historiography		• Shea 16-44 • Biagioli 159-209

Guidelines for writing the final essay.
The essay, which must be word processed, should no more than **6000 words** (do not count words in footnotes and bibliography). A good essay generally begins with an "introduction" section, in which you states the objectives of the essay. It contains a number of paragraphs in which you develop your ideas. Finally, it concludes with a "conclusion" section, in which you summarize the essay's contents and what you have achieved.

Your essay will approach research level. This means that apart from getting all of the details of scientific writing right (bibliography, footnotes, etc.) you should be able to offer an original discussion. The readings are a good starting point for the essay. But you need to explore more and identify further relevant bibliography.
Write a bibliography at the end of your essay comprising two sections: a) one listing all the books and papers quoted in the essay, and b) one listing those which you have consulted but not quoted.
Items in the bibliography must follow a coherent pattern throughout. A typical style of bibliographic information is the alphabetical order according to the surname of authors.
Here are two examples. You can follow their format.

> Ariew, Roger. "Galileo's Lunar Observations in the Context of Medieval Lunar Theory." *Studies in History and Philosophy of Science* 15 (1984) 213-226.
>
> Galilei, Galileo. *Dialogue Concerning the Two Chief World Systems*. Trans. by Stillman Drake. New York: Modern Library, 2001.

When quoting sources in the essay you must place the references in footnotes. In the footnotes you must refer to the items in the bibliography in an abbreviated form. Here is a complete example, where you quote a sentence from a **book**, placing the reference in a footnote(in this case footnote number 3).

> In Dobbs's view, "Newton wished to look through nature to see God".[3] Her analysis suggests that…
>
> ...
>
> ———
>
> [3] Dobbs *The Janus Faces of Genius. The Role of Alchemy in Newton's Thought*, p. 12.

The technique is basically the same if you quote from a **paper**. Here is an example.

> According to Christoph Lüthy, "Bruno believed that there existed only one, spherical type of atom, and he wrongly attributed the same view to Democritus".[12] This means that…
>
> ...
>
> ———
>
> [12] Lüthy "The Fourfold Democritus on the Stage of Early Modern Science", p. 451.

Note, however, that since you quote a paper you need to use the appropriate format (this is important because thanks to a different format the reader immediately recognizes that Lüthy's work is a paper, not a book).