

MALS: THE TRIALS OF GALILEO

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Description

This course will provide an introduction to Classical Astronomy, with particular attention to the Copernican Revolution. It will consist of three parts. The first part will study the problem of Plato, who required explanation of the anomalous motions of the planets in terms of circular motion at constant speed. Computer graphics programs will be applied to implement the basic geocentric constructions put forward by Eudoxos and by Hipparchus (c200b) as solutions to the problem. The latter construction, refined ad libitum by Ptolemy (c200a) and later by Arab mathematicians, will be of central interest, because the move to supplant it by a corresponding heliocentric version constitutes what in retrospect we have come to call the Copernican Revolution. The second part of the course will study excerpts from the basic work of Copernicus: *On the Revolutions of the Heavenly Spheres* (1543a). The objective will be to explain the criticisms by Copernicus of the current form of Ptolemaic astronomy, to describe the revisions which he proposed, but then to show that Copernican astronomy improved upon the Ptolemaic neither in clarity of structure nor in predictive force but only in an aesthetic sense imperceptible to all but a few. Given the authority of Aristotelean physics, which loomed in conflict with the proposals of Copernicus, one must ask why the new astronomy did in time prevail. This question will be the focus of the third, the most refined part of the course. Excerpts from the relevant works of Kepler, of Galileo, and of the Jesuits will be introduced to show the gradual accumulation of observational evidence in favor of the new astronomy. The significance of the telescope will be emphasized. The celebrated TRIALS OF GALILEO, in context of CounterReformation politics, will set the focus for discussion. The course will conclude by considering, briefly, excerpts from the definitive work of Newton: *The Principles of Natural Philosophy* (1687a). This great treatise marked unequivocally the end of the old and the beginning of the new world order. Computer graphics programs will be applied to describe Kepler's (empirical) laws of planetary motion and the development of these laws from the general principles of motion by Newton.

As a coda, we will examine the efforts of John Paul II, in the last decade of the Twentieth Century, to review and revise the judgement of the second trial of Galileo (1633).

Prerequisites

None.

Principal Texts

Nicolas Copernicus

On the Revolutions of the Heavenly Spheres[°], 1543

Stillman Drake

Galileo[•], 2001

Annibale Fantoli

The Case of Galileo: A Closed Question?[•], 1996

Galileo Galilei

Siderius Nuncius[°], 1610

Galileo Galilei

Dialogue on the Two Chief Systems of the World[°], 1632

Thomas Kuhn

The Copernican Revolution[•], 1957

James Lattis

Between Copernicus and Galileo[•], 1994

Ernan McMullin (Editor)

The Church and Galileo[•], 2005

Isaac Newton

The Principles of Natural Philosophy[°], 1687

Jerry Smith

Galileo: His 17th Century Trials and 20th Century Rehabilitation[•],
(MALS Degree Paper) 2003

The [•] signals a required text, the [°] signals that excerpts will be provided.

Secondary Texts

Mario Biagioli

Galileo, Courtier, 1993

Berthold Brecht

Galileo (A Play), 194-

Massimo Bucciantini

Galileo's Telescope: A European Story

John Robert Christianson

On Tycho's Island, 2003

Dennis Danielson

The First Copernican, 2006

Stillman Drake (Translator)
Discoveries and Opinions of Galileo, 1957

Samuel Y. Edgerton
The Mirror, the Window, and the Telescope, 2009

Rivka Feldhay
Galileo and The Church, 1995

Owen Gingerich
The Eye of Heaven, 1993

John Heilbron
Galileo, 2012

John Heilbron
The Sun in the Church, 1999

Alan Hirshfeld
Parallax, 2001

Arthur Koestler
The Sleepwalkers, 1959

Alexander Koyrè
From the Closed World to the Infinite Universe, 1957

Lawrence Lipking
What Galileo Saw, 2014

Alan MacFarlane and Gerry Martin
Glass, 2002

P. Machamer (Editor)
The Cambridge Companion to Galileo, 1999

O. Neugebauer
The Exact Sciences in Antiquity, 1969

Mark A. Peterson
Galileo's Muse, 2011

Frederick Purnell, Jr.
The Trial of Galileo, 2008

Giorgio de Santillana
The Crime of Galileo, 1955

Caleb Scharf
The Copernicus Complex, 2014

W. R. Shea and M. Artigas
Galileo in Rome, 2003

Dava Sobel
Galileo's Daughter, 1999

Duncan Steel

Marking Time, 2000

S. Toulmin and J. Goodfield

The Fabric of the Heavens, 1961

Course Meetings and Papers

The course sessions will be conducted as lectures/conferences. One final paper will be required. For each student, the topic of the paper will be developed during the semester in a series of written proposals and in discussion with the instructor. Probably, the topic will be selected from the references.