# History of Science

## Prof. Franco Giudice

COURSE AIMS AND INTENDED LEARNING OUTCOMES

The course aim is to teach students the origins of modern science, that is, the complex historical reality that unfolded between the fifteenth and eighteenth centuries and that led to a new way of conceiving man and nature (and, consequently, the place of man in nature). Students are expected to learn about the different scientific conceptions and our lifestyles, so as to be able to provide "educational advice" on the ethical, political and religious problems that science and technology pose in contemporary societies.

The course aims to offer students an in-depth knowledge of the main paths that led to the birth of modern science, in the period between Copernicus and Newton. The specific course aims are the following:

1. Provide students with an overview of the main changes that have occurred in the field of cosmology, astronomy, physics, technology, medicine, including at the institutional level (universities, scientific academies, museums, curiosity cabinets), and the relationships between science and religion.
2. Carry out a comparison between the concepts – matter, movement, time, space, force – that guided the developments of modern science and the synthesis that Newton made of them in his new world system.
3. Analytically and critically evaluate the meaning of the Newtonian Synthesis in light of the twentieth-century revolutions in the field of physics and cosmology.

At the end of the course, students will be able to:

1. Possess a thorough knowledge of all the main elements characterising modern science and its most important protagonists (Copernicus, Brahe, Vesalius, Kepler, Galileo, Harvey, Descartes, Boyle, Newton).
2. Know and be able to apply the philosophical-scientific lexicon and conceptual devices learned from the analysis of texts to the historical-scientific context considered and apply the same ability to other historical-scientific contexts.
3. Know how to communicate and argue scientific theories related to the topics covered, taking into account the conceptual devices and lexical tools learned during the course.

COURSE CONTENT

The course is divided into two sections.

The first general section is dedicated to illustrating the most significant stages towards the birth of modern science, through an analysis of the streams of thought, the protagonists, their works, and the debates that their new theories triggered against traditional knowledge.

The second single-subject section will have as its object the relationship between science and religion, especially as configured by Galileo and Newton. By the former, the course will study and analyse the so-called Copernican writings (in particular the letter to Benedetto Castelli of 21 December 1613), while by the latter the course will study and analyse the *General Scholium* added to the second edition of *the Mathematical Principles of Natural Philosophy* (1713) and the correspondence with the theologian Richard Bentley, where for the first time Newton attributes the origin and order of the universe to the intelligent design of God.

READING LIST

Manual

Antonio Clericuzio, Uomo e natura. Scienza, tecnica e società dall’antichità all’età moderna, Rome, Carocci, 2022, chs. 3 and 4.

Texts

Galileo Galilei, Scienza e religione. Scritti copernicani, edited by M. Buccantini and M. Camerota, Rome, Donzelli, 2009.

Isaac Newton, Principi matematici della filosofia naturale, Turin, Einaudi, 2018, pp. 92-96, 98-118 (with related commentary notes on pp. 186-216).

Suggested readings

M. Camerota-F. Giudice-S. Ricciardo, Galileo ritrovato. La lettera a Benedetto Castelli del 21 dicembre 1613, Brescia, Morcelliana, 2019.

R. Iliffe, Newton. Il sacerdote della natura, Milan, Hoepli, 2019.

TEACHING METHOD

Classroom lectures with the support of slides, which provide for the active participation of students in the discussion and the possibility of submitting written papers to be presented and discussed.

ASSESSMENT METHOD AND CRITERIA

An oral exam, covering both the general and the single-subject sections, which aims to ascertain – with regard to the topics covered during the course – the following: 1) the practical and analytical reading of the texts indicated; 2) the ability to present the contents and the argumentative structure used; 3) the aptitude to argue and to express difficult and complex concepts with clarity and rigour; and 4) the mastery of a technical and correct style and vocabulary.

NOTES AND PREREQUISITES

No prerequisites are required.

Further information can be found on the lecturer's webpage at http://docenti.unicatt.it/web/searchByName.do?language=Eng or on the Faculty notice board.