## **History of Scientific Revolutions**

## Prof. Franco Giudice

***COURSE AIMS AND INTENDED LEARNING OUTCOMES***

The course aims to ensure that students acquire knowledge of what historians mean by the concept of “scientific revolution”, specifically through a case study, namely the analytical study of a real example, that of Newton’s theory on light and colours. Students are expected to develop an awareness of the relationships between the different scientific conceptions of nature and of our life styles, and consequently be competent in providing “educational consulting” on ethical and political problems raised by science and technology in contemporary societies. Specifically, the course has the following objectives:

1. To provide students an overview of the main ancient, medieval and modern conceptions on the nature of light and on the origin of colours, and on Newton’s related theories
2. To show how Newton elaborated and developed his revolutionary theory that sunlight is a heterogeneous mixture of rays of different colours and not, as had been widely believed for thousands of years, a uniform and homogeneous element.
3. To analytically and critically assess the impact of this revolutionary theory at the time on scientific culture.

At the end of the course, students will have acquired:

1. In-depth knowledge of Newton’s theory on light and colours.

2. Knowledge of and the ability to apply the philosophical-scientific lexicon and conceptual tools acquired analysing texts to the concerned historical-scientific context, and to apply the same skills to other philosophical and historical-scientific contexts.

3. The ability to communicate and argue scientific theories on the covered topics, taking into account the conceptual and lexical tools learnt during the course.

***COURSE CONTENT***

The course is divided in three parts. The first part will cover the analysis of the main pre-Newtonian theories of light and colours, with particular reference to those of Aristotle, the authors of Medieval perspectivist optics Descartes, Boyle and Hooke. The second part will focus on the path that Newton followed to discover the composite nature of light, from the years in which he was still a student at Trinity College, Cambridge, up to the final formulation in *Opticks*, that he wrote in 1704. Finally, the topic of the third part will be the acceptance of Newton’s theory and the ensuing controversies.

***READING LIST***

Textbooks

I. Newton, *Scritti sulla luce e i colori*, edited by F. Giudice, Milan, BUR, 2006 (or subsequent editions)

F. Giudice, *Lo spettro di Newton. La rivelazione della luce e dei colori*, Rome, Donzelli, 2009.

***TEACHING METHOD***

The teaching will be held through lectures in the classroom, with the aid of slides, during which students are expected to actively participate in discussions and may submit, present and discuss written papers.

***ASSESSMENT METHOD AND CRITERIA***

Students will be assessed on the basis of an oral exam covering course content, according to the following criteria: 1) actual and comprehensive analytical reading of the specified texts; 2) ability to present both their content and argumentative structure; 3) aptitude to argue and clearly and rigorously express also difficult and complex concepts; 4) proficiency in mastering a technical and appropriate lexicon.

***NOTES AND PREREQUISITES***

There are no prerequisites in order for students to attend the course.

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.