Universitat Autònoma de Barcelona

**2019/2020**

# Science in History

Code: 42279
ECTS Credits: 15

| Degree | Type | Year | Semester |
|---|---|---|---|
| 4313223 History of Science: Science, History and Society | OB | 0 | 1 |

## Contact

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## Use of Languages

Principal working language: spanish (spa)

## Teachers

Annette Mulberger
Jorge Molero Mesa
Carlos Tabernero Holgado
José Pardo Tomás
Jon Arrizabalaga Valbuena
Oliver Hochadel
Maria Emilia Calvo
Carlos Dorce

## Prerequisites

There are none.

## Objectives and Contextualisation

To understand and characterize the major stages of the history of science, and the different views on the nature and social relations of science through history
To communicate orally and in writing historical arguments
To interpret, comment upon and edit scientific texts of the past and to be able to place them in their historical contex

## Competences

- Analyse the multiple approaches to science's past taken by different authors and schools, and make reasoned choices between them.
- Apply this discipline's own analysis methods and techniques in the construction of various historical narratives.
- Communicate and justify conclusions clearly and unambiguously to both specialised and non-specialised audiences.
- Develop an original, interdisciplinary historical narrative that integrates humanistic and scientific culture.

- Display a sound knowledge of history so as to pinpoint the great events of the past with accuracy: authors, theories, experiments, practices, etc., and their stages of stability and transformation.
- Display rigorous, advanced knowledge of the evolution of science throughout history.
- Gather and critically assess information for problem solving, in accordance with the discipline's own analysis methods and techniques.
- Interpret, comment on and edit scientific texts on science's past and place them rigorously within their historical context.
- Use acquired knowledge as a basis for originality in the application of ideas, often in a research context.
- Use information and communication technologies appropriately in research and in professional activity.
- Work in interdisciplinary teams, showing leadership and initiative.
- Work independently: solving problems, taking decisions and making innovative proposals.

## Learning Outcomes

1. Analyse in depth the role of scientific instruments, experiments and the material culture of science in general throughout history.
2. Assess the virtues and the limitations of the different history of science textbooks.
3. Communicate and justify conclusions clearly and unambiguously to both specialised and non-specialised audiences.
4. Construct a critical bibliography on a particular problem in the history of science, using databases and directories.
5. Critically analyse the different narratives of the great paradigms of science.
6. Display methodological habits in historical text commentary.
7. Distinguish the different approaches taken by text books aiming to present a global vision of the history of science.
8. Distinguish the historical moments of change, transformation and even revolution in scientific thought.
9. Distinguish the leading historians specialising in each of the major stages in the history of science.
10. Gather and critically assess information for problem solving, in accordance with the discipline's own analysis methods and techniques.
11. Identify and analyze the pertinent bibliography to expose the state of the question of a certain historiographic problem.
12. Identify areas of intersection between humanistic and scientific culture, such as the problem of science and religion, science and power, or science and technology.
13. Identify the great driving ideas of natural philosophy and modern science with their elements of change and continuity.
14. Identify the social and cultural factors that have influenced the development of science throughout history.
15. Integrate intellectual and material factors (internal and external) when developing a historical narrative of science.
16. Know the biographical profiles of the great scientists and natural philosophers of the past.
17. Recognise and identify in detail the great stages in the history of science, from antiquity to the 20th century.
18. Recognise the main aspects of ancient science medieval science, the science revolution, the science of the Illustration, the science of the 19th century and that of the 20th century.
19. Relate primary sources to the historical context in which they were written, disseminated and responded to.
20. Rigorously analyse any scientific theory throughout history.
21. Understand, contextualise and analyse the different primary and secondary sources with rigour.
22. Use acquired knowledge as a basis for originality in the application of ideas, often in a research context.
23. Use footnotes when writing historical texts.
24. Use information and communication technologies appropriately in research and in professional activity.
25. Work in interdisciplinary teams, showing leadership and initiative.
26. Work independently: solving problems, taking decisions and making innovative proposals.

## Content

1. Introduction: Science and History

Part 1. Science in Antiquity

2. The birth of science?

3. Astronomy and cosmology

4. Mathematics and Geometry

5. The natural philosophy of Aristotle

6. Medicine and the Life Sciences

Part 2. Medieval Science

7. The establishment of a scientific corpus

8. The golden age of Arabic science

9. New institutions and translations

10. The transmission of knowledge

11. Medicine, Science in the Middle Ages and the Renaissance

12. The medieval cosmos

Part 3. The Scientific Revolution

13. The Copernican Revolution

14. Galileo and movement; Harvey and blood circulation

15. The reform of knowledge: Bacon and Descartes

16. Newton: The world system

Part 4. The Enlightenment

17. Actors and spaces of natural philosophy

18. The Encyclopedia and the crisis of the Enlightenment

19. The Chemical Revolution

Part 5. The rise of science

20. Evolution and laboratory medicine

21. The human sciences

22. The sciences of matter and energy

Part 6. contemporary Science

23. Little science, big science

24. The molecular view of life

25. Science and power in the Cold War

Oral presentations and synthesis

First session of presentations

Second session of presentations

Session summary and conclusions

## Methodology

This compulsory module offers an overview of the historical development of science, from antiquity to the twentieth century. The course is arranged by chronological blocks taught by lecturers who specialize in each of the periods, and addresses both the different points of view about nature, as the social relations of science through history. It is a first approach to the development of science, technology and medicine over the centuries, which serves as a basis for further deepening into specific issues

## Activities

| Title | Hours | ECTS | Learning Outcomes |
|---|---|---|---|
| Type: Directed | | | |
| Lectures | 93 | 3.72 | 20, 5, 1, 21, 16, 6, 7, 8, 9, 14, 12, 13, 15, 18, 17, 19, 22, 2 |
| Type: Supervised | | | |
| Methodological seminars | 6 | 0.24 | 4, 6, 3, 23 |
| Supervision of essays | 40 | 1.6 | 21, 6, 3, 10, 19, 26, 25, 24 |
| Type: Autonomous | | | |
| Reading and writing | 218 | 8.72 | 21, 4, 6, 9, 11, 15, 3, 10, 17, 19, 26, 24, 23, 2 |

## Assessment

Based on the compulsory readings and presentations in class, students must submit an essay of 1,200-1,500 words for each of the chronological blocks of which the course is composed (A1-A6). At the end of the course, each student will make a 15 minute presentation dealing with a specific topic previously agreed with the course coordinators (A7).

The essays will be submitted through the Aula Moodle, in the indicated periods, and will be marked in the week following its delivery. The student will be able to review them with the teacher responsible for the cailification, or will receive the comments through the Aula Moodle. Each essay included in the evaluation contributes 20% to the final grade.

To pass it will be essential to credit at least 4 of the 6 reviews, as well as the oral presentation (A7). The final grade will result from the average of five elements: the four best grades of A1-A6 and A7.

## Assessment Activities

| Title | Weighting | Hours | ECTS | Learning Outcomes |
|---|---|---|---|---|
| Essays A1-A6 | 80% | 12 | 0.48 | 20, 5, 1, 21, 4, 16, 6, 7, 8, 9, 14, 12, 11, 13, 15, 3, 10, 18, 17, 19, 22, 26, 24, 23, 2 |
| Presentation A7 | 20% | 6 | 0.24 | 3, 22, 25 |

## Bibliography


General Works

BOWLER, Peter J.; MORUS, Iwan Rhys (2007), *Panorama general de la ciencia moderna*. Crítica. Barcelona.

BYNUM, W.F.; PORTER, Roy (eds.) *Encyclopedia of the History of Medicine.* 2 vols. Routledge. London 1994.

FARA, Patricia (2009) *Breve historia de la ciencia*. Ariel. Barcelona

HENRY, John, 2012. *A Short History of Scientific Thought*. Basingstoke y Nueva York: Palgrave macmillan.

OLBY, G.N. CANTOR, J.R.R. CHRISTIE, M.J.S. HODGE (eds.) (1990) *Companion to the History of Modern Science*. Routletge. Londres.

SOLIS, Carlos; SELLÉS, Manuel (2005) *Historia de la Ciencia*. Espasa. Madrid

Specific Periods

LINDBERG, David C. (2002) *Los inicios de la ciencia occidental*. Barcelona: Paidós.

LLOYD, Geoffrey E.R. (1973) *De Tales a Aristóteles*. Buenos Aires: Eudeba.

VERNET, Joan (1999) *Lo que Europa debe al Islam de España*. Barcelona: Acantilado.

CROMBIE, Alister C. (1996) *Science, Art and Nature in Medieval and Modern Thought.* London: The Hambledon Press.

SHAPIN, S. (2000) *La revolución científica. Una interpretación alternativa*. Barcelona: Paidós.

HENRY, J. (2008). *The Scientific Revolution and the Origins of Modern Science*. Basigtoke y Nueva York: Palgrave Macmillan.

CLARK, W., GOLINSKI, J. and SCHAFFER, S., eds. (1999). *The sciences in enlightened Europe*. Chicago/Londres: The University of Chicago Press.

BEN-DAVID, J. (1991) *Scientific growth. Essays on the social organization and ethos of science*. Berkeley: University of California Press.

KRIGE, J.; PESTRE, D., eds. (2003). *Companion to Science in the Twentieth Century*. Amsterdam: Harwood.

AGAR, J. (2012). *Science in the 20th Century and Beyond*. Cambridge: Polity Press.