

The Origins of Modern Science

Code: 42284

ECTS Credits: 15

2025/2026

| Degree | Type | Year |
|--|------|------|
| History of Science: Science, History and Society | OT | 0 |

Contact

Name: Jaume Sastre Juan

Email: jaume.sastre@uab.cat

Teachers

Jesús María Galech Amillano

Miquel Forcada

Josep Casulleras

Montserrat Díaz

Teaching groups languages

You can view this information at the [end](#) of this document.

Prerequisites

There are none.

Objectives and Contextualisation

The overall objective is to identify the elements that characterize multicultural premodern science, as well as those that distinguish the new scientific guidelines that emerge in the sixteenth and seventeenth centuries. This implies the recognition of the essential elements that make up the history of astronomy, astrology and mathematics in natural and medical sciences in medieval times, and of the fundamentals of the relationship between science, natural philosophy and religion in the Scientific Revolution.

Competences

- Apply this discipline's own analysis methods and techniques in the construction of various historical narratives.
- 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.
- "Recognise, evaluate and catalogue the scientific and technical heritage (this competence is acquired by students who take the specialisation ""Communication, Heritage and History of Science"")."
- 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. Ascribe medieval astronomical instruments to their historical period and their political, social, cultural and technological environment.
2. Assess the processes of transmission and transformation of medicine and the natural sciences in Arab-Islamic civilisation and their contribution to European scientific development.
3. Contextualise and scientifically exploit the various primary sources.
4. Critically apply knowledge of secondary sources and documentation strategies.
5. Describe what medieval doctors and naturalists knew and how they reasoned and acted, and know the institutions in which they conducted their activity.
6. Explain the (conceptual, technological and artistic) origin and evolution of medieval astronomical instruments.
7. Explain the fundamental aspects of the relationships between science, philosophy and religion in the 17th century.
8. Explain the institutional and scientific role of the medieval Islamic observatories, and the names and contributions of the most significant Arabic astronomers.
9. Formulate a narrative for presenting and communicating.
10. Formulate detailed critical syntheses of complex topics within the thematic area of the module.
11. Gather and critically assess information for problem solving, in accordance with the discipline's own analysis methods and techniques.
12. Identify and distinguish fundamental aspects of the problem areas in natural philosophy in the 17th century, such as matter and activity, mechanical philosophy and mechanistic science, mechanical philosophy and experimental philosophy, and the relationship of God with the mechanical universe.
13. Identify and distinguish the different relevant contexts and their relations in the trial of Galileo.
14. Identify and distinguish the main elements of the two great moments in the trial of Galileo (1610-1616 and 1623-1633).
15. Identify and distinguish the multicultural elements belonging to premodern science.
16. Organise and manage information on the origins of modern science.
17. Present one's own ideas orally and in writing.
18. Recognise the essential elements of the history of medieval science, especially astronomy and medical and natural sciences.
19. Recognise the role of astrology and the Islamic religion in the development of Arabic astronomy.
20. Recognise the typological morphology that identifies the different Arabic astronomical instruments and their connections to subsequent European instruments.
21. Understand and contextualise the secondary literature on the theme of the module.
22. Use acquired knowledge as a basis for originality in the application of ideas, often in a research context.
23. Use information and communication technologies appropriately in research and in professional activity.
24. Work in interdisciplinary teams, showing leadership and initiative.
25. Work independently: solving problems, taking decisions and making innovative proposals.

Content

Block 1a. Medieval and Arabic Science: Natural and Medical Sciences

1. The acculturation of the classical scientific legacy
2. The acculturation of the classical scientific legacy: the natural and medical sciences
3. The development of medical manuals
4. The case of al-Andalus: the beginnings of the scientific tradition (ss. IX-X)
5. Al-Andalus: the natural and medical sciences s.XI
6. Al-Andalus: medical sciences, natural and following the ss.XII
7. Influence of Islamic medicine and the natural sciences in Europe
8. An overview of medicine and the natural sciences in the Islamic world

Block 1b. Medieval and Arabic Science: Astronomy and astrology mathematics

1. Astronomy, Astrology and Islam
2. The astronomers' activity: practical problems and theoretical research
3. Construction and use of the astrolabe, a medieval computer
4. Applied astronomy: geography and geodesy, orientation, time keeping, calendar
5. The three fundamental practices of the horoscope: aspects, houses and progressions
6. Authors, methods and attributions in astrology
7. The astrolabe in astrology
8. The other tools of the astrologer: tables and calculations

Block 2 Aspects of Scientific Revolution

1. Science and the Renaissance
2. Medicine and astrology in the XVI and XVII centuries
3. The astronomical revolution: Copernicus to Galileo
4. The new science of motion
5. The experimental philosophy
6. The mechanical philosophy

7. The Newtonian synthesis

8. Chemistry and the Scientific Revolution

Final synthesis session

Activities and Methodology

| Title | Hours | ECTS | Learning Outcomes |
|---------------------|-------|------|---|
| Type: Directed | | | |
| Lectures | 90 | 3.6 | 21, 3, 5, 10, 8, 7, 6, 12, 13, 15, 14, 1, 11, 19, 18, 20, 22, 24, 23, 2 |
| Type: Autonomous | | | |
| Readings and essays | 275 | 11 | 4, 21, 3, 5, 10, 9, 8, 7, 17, 12, 13, 15, 14, 16, 11, 19, 18, 20, 25, 23, 2 |

The course is organized into two parts that cover the medieval period and the Scientific Revolution, respectively.

with the participation of students through the discussion of the proposed readings and the resolution of exercises

English could be used in some of the sessions, as it is a teaching language of the Master.

Note: 15 minutes of a class will be reserved, within the timetable established by the centre/title, for the compleme

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Assessment

Continous Assessment Activities

| Title | Weighting | Hours | ECTS | Learning Outcomes |
|---|-----------|-------|------|---|
| Continued assistance and participation in the classroom | 30 % | 3 | 0.12 | 4, 21, 3, 5, 10, 9, 8, 7, 6, 17, 12, 13, 15, 14, 1, 16, 11, 19, 18, 20, 22, 24, 23, 2 |
| Essay review part 1a | 20 % | 2 | 0.08 | 9, 11, 22, 25, 23 |
| Exercises part 1b | 20 % | 2 | 0.08 | 9, 11, 22, 25, 23 |
| Two essays part 2 | 30 % | 3 | 0.12 | 9, 11, 22, 25, 23 |

Evaluation:

- Assistance and active participation in the carrying out of exercises and in the discussion in the classroom of the proposed readings; weight: 30%.
- Block 1a: presentation of essay; weight: 20%.
- Block 1b: solving exercises; weight: 20%.
- Block 2: two reviews of two articles; weight: 30%.

Review of qualifications

Each teacher will indicate to the students the specific dates for reviewing the corresponding grades in their blog.

Reassessment

Submission of a corrected version of evaluation activities not passed. The reassessment will take place in June.

On carrying out each evaluation activity, lecturers will inform students (on Moodle) of the procedures to be followed for reviewing all grades awarded, and the date on which such a review will take place.

Students will obtain a "Not assessed/Not submitted" course grade unless they have submitted more than 30% of the assessment items.

In the event of a student committing any irregularity that may lead to a significant variation in the grade awarded to an assessment activity, the student will be given a zero for this activity, regardless of any disciplinary process that may take place. In the event of several irregularities in assessment activities of the same subject, the student will be given a zero as the final grade for this subject.

This subject entirely prohibits the use of AI technologies in all of its activities. Any submitted work that contains content generated using AI will be considered academic dishonesty; the corresponding grade will be awarded

a zero, without the possibility of reassessment. In cases of greater infringement, more serious action may be taken.

Bibliography

Part 1

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VERNET, J.: *La cultura hispanoárabe en Oriente y Occidente*, Barcelona, 1978 (Reedició amb el títol *Lo que la cultura europea debe a los árabes de España*, Barcelona, 1999).

CATÀLEGS: *Instrumentos astronómicos en la España medieval* (1985) i *El legado científico andalusí* (1992).

Part 2

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Software

In addition to web and Office tools, such as the campus online, email, Google docs, word, powerpoint and excel, tools such as wetransfer, dropbox or the VLC audiovisual file reader might be used.

Groups and Languages

Please note that this information is provisional until 30 November 2025. You can check it through this [link](#). To consult the language you will need to enter the CODE of the subject.

| Name | Group | Language | Semester | Turn |
|-----------------------|-------|----------|-----------------|-----------|
| (TEm) Theory (master) | 1 | Catalan | second semester | afternoon |

