History of Mathematics

Code: 106082
ECTS Credits: 6

2025/2026

Degree	Type	Year
Mathematics	OT	4
Science, Technology and Humanities	OT	4

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Teachers

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Teaching groups languages

You can view this information at the end of this document.

Prerequisites

There are none.

Objectives and Contextualisation

The subject deals with the past and present of Mathematics with 4 aims:

1. The discipline. To describe the main changes in the structure, methods and concepts of Mathematics.
2. The mathematicians. To identify the practioners of Mathematics and those who have supported it, taking into account the gender perspective.
3. The social and cultural relations. To analize the relations between mathematics, society and culture.
4. The sources. To recognize the historical sources of Mathematics and the methodological problems they pose.

The subject also has the general aim of improving the student's capacity to advance and contrast arguments.

Competences

Mathematics

- Actively demonstrate high concern for quality when defending or presenting the conclusions of one's work.
- Assimilate the definition of new mathematical objects, relate them with other contents and deduce their properties.
- Distinguish, when faced with a problem or situation, what is substantial from what is purely chance or circumstantial.
- Effectively use bibliographies and electronic resources to obtain information.
- Generate innovative and competitive proposals for research and professional activities.
- Identify the essential ideas of the demonstrations of certain basic theorems and know how to adapt them to obtain other results.
- Students must be capable of applying their knowledge to their work or vocation in a professional way and they should have building arguments and problem resolution skills within their area of study.
- Students must be capable of communicating information, ideas, problems and solutions to both specialised and non-specialised audiences.
- Students must develop the necessary learning skills to undertake further training with a high degree of autonomy.
- Take sex- or gender-based inequalities into consideration when operating within one's own area of knowledge.

Science, Technology and Humanities

- Act with ethical responsibility and respect for fundamental rights and duties, diversity and democratic values.
- Analyse questions related to science and technology in society, using basic, essential forms of mathematical and statistical reasoning.
- Construct discourse on scientific and technical knowledge using the linguistic resources of argument.
- Display a capacity for organisation and planning and, at the same time, for adapting to new problems or situations.
- Identify the various philosophical, ethical and sociological conceptions of science and technology and recognise their evolution throughout history.
- Recognise and interpret the elements that integrate the material and visual culture of science and technology into the different stages of its development.
- Recognise the political, social and cultural dimension of science and technology development in the different historical periods.
- Students must be capable of collecting and interpreting relevant data (usually within their area of study) in order to make statements that reflect social, scientific or ethical relevant issues.
- Students must be capable of communicating information, ideas, problems and solutions to both specialised and non-specialised audiences.
- Students must develop the necessary learning skills to undertake further training with a high degree of autonomy.

Learning Outcomes

1. Actively demonstrate high concern for quality when defending or presenting the conclusions of one's work.
2. Analyse key questions on the basis of evidence and argument, synthesising information and developing reasoned arguments based on the collection and interpretation of significant data.
3. Assess the impact of the difficulties, prejudices and discriminations that actions or projects may involve, in the short or long term, in relation to certain persons or groups.
4. Be able to analyse and synthesise.
5. Carry out academic assignments independently, using source materials (especially in English) and databases, and in collaboration with other professionals.
6. Collect and interpret data on which to substantiate the conclusions drawn, including, where necessary, a reflection on social, scientific or ethical matters in the field of humanities.
7. Communicate complex information clearly and precisely, whether orally, in writing or by using ICT, to specialist and non-specialist audiences.
8. Communicate effectively orally and in writing.
9. Critically follow the arguments exposed by others.
10. Describe and analyse Einstein's physical arguments and his way of presenting them.

11. Describe and analyse Galileo's contribution to the establishment of a mathematical and experimental physics.
12. Describe and analyse Galileo's demonstration of the law of the fall of weights and characterise the mathematisation of movement.
13. Describe and analyse the reaction of the public and the scientific community to Einstein's visit to Spainin 1923.
14. Describe the changes in the methods and instruments of physics, in relation to the division of the discipline into different areas.
15. Describe the contribution of Newton to the use of mathematics in natural philosophy.
16. Describe the origins of the concept of field.
17. Describe the problems posed by the use of instruments for natural philosophy.
18. Describe the relationship between the theory of relativity and the problems of electrodynamics of bodies in movement.
19. Described the Platonic attitude to the mathematical substantiation of physical reality.
20. Develop an understanding of the structure and content of the mathematical principles in Isaac Newton's natural philosophy.
21. Develop critical thinking and reasoning and communicate ideas effectively, both in the mother tongue and in other languages.
22. Develop independent learning strategies.
23. Develop self-directed learning.
24. Devise mathematical strategies and objectives when faced with new problems or challenges from different fields of mathematics or from science and society in general.
25. Devise mathematical strategies and objects to address new problems or challenges in different areas of mathematics itself or in science in general and society.
26. Differentiate the different stages of formation of the main areas of mathematics (algebra, arithmetic, analysis, geometry, etc.) and know how to discuss the relevance of this grouping.
27. Display advanced knowledge and understanding of theory and practice and of the work methodologies specific to the humanities, thus achieving a high level in knowledge generation.
28. Distinguish the different stages of education in the main areas of physics, and the reasons for their grouping into categories like Aristotelian physics, geocentric physics, Newtonian physics,classical physics and modern or contemporary physics.
29. Effectively use bibliographies and electronic resources to obtain information.
30. Explain and analyze the deontological code of the profession.
31. Explain the challenge of mathematising electricity in the Enlightenment, from an analysis of the experimental demonstration of the law of force between charged objects.
32. Explain the relationship between Galilean kinematics and Copernican cosmology.
33. Explain the relationship between these factors and their impact on the practice of physics and the arrival of the laboratory.
34. Explain the sense in which Hertz states that Maxwell's theory is Maxwell's system of equations.
35. Gain access to the sources, concepts and theories needed to approach studies in the areas of this degree.
36. Generate innovative and competitive proposals for research and professional activities.
37. Identify the factors that lead to the professionalisation of research and the teaching of physics in the nineteenth century, especially in France and Germany.
38. Integrate elements from different areas of knowledge to analyse a situation and suggest actions or solutions.
39. Know that in the past, an illicit use of genetics has been made to promote racist ideologies.
40. Know the scientific and technological developments achieved in Asia and Africa throughout history, from the third millennium before the Common Era up to the present day.
41. Present a map of technological and scientific knowledge with its debts and contributions between the various forms of science and technology.
42. Question ethical problems in the Arab and Islamic world and East Asia, and reconsider humanistic values in our society, concerning social and moral engagement.
43. Read advanced mathematics textbooks in English.
44. Reason critically.
45. Reason critically, show analytical skills, use technical language correctly and formulate logical arguments.

46. Recognise the cultures that have developed in Asia and Africa, attaching importance to the different forms of knowledge and action that have arisen there.
47. Recognise the main stages in the development of contemporary physics in Spain and Catalonia.
48. "Recognise the original meaning of the term ""physics"". "
49. Recognise the relationships between physics, philosophy and culture throughout history.
50. Recognize the different traditions that shaped the genesis of electromagnetic theory.
51. Recognize the relationships between mathematics, philosophy and culture throughout history.
52. Respect diversity in ideas, people and situations.
53. Students must be capable of applying their knowledge to their work or vocation in a professional way and they should have building arguments and problem resolution skills within their area of study.
54. Students must be capable of communicating information, ideas, problems and solutions to both specialised and non-specialised audiences.
55. Students must develop the necessary learning skills to undertake further training with a high degree of autonomy.
56. Synthesize, based on the historical advance of genetics, a perspective of the current and future scope of this science.
57. Take part in discussions in which different points of view regarding the historical significance of a physics text or problem are played off against each other.
58. Through personal arguments or procedures, apply the knowledge acquired and the ability to solve problems to complex situations concerning the humanities, including specialist professional activities that require creative, innovative ideas.
59. To place chronologically and thematically the main concepts and practices that led to the crisis of the foundations at the beginning of the 20th century.
60. Understand the essence of an informative but specialised conference on mathematics.
61. Use and manage bibliographic information, or computer- or internet-based resources within the area of study, in the first languages and in English.
62. Visibility of the contributions of women in mathematics through the study of historical or current cases.

Content

The contents are arranged in two parts. The first one deals with the rise of classical mathematics, from Antiquity through to the Enlightenment; the second deals with the development of contemporary mathematics.

Part 1
1 Introduction: mathematics and history
2 The origins of mathematics as a practice
3 The birth of mathematics as a science
4 The cultural journey of ancient mathematics
5 Mathematical instruments and the rise of calculus

Part 2
6 Professionalization and culmination of a classical science
7 Development and crisis of a modern discipline
8. The foundations of mathematics
9 Themes of contemporary mathematics
10 Mathematics, gender and society in the XX century

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			

Practical lectures	14	0.56	1, 30, 55, 54, 53, 51, 9, 59, 62
Seminars	5	0.2	1, 55, 54, 53, 9, 29
Theoretical lectures	30	1.2	30, 51, 9, 59, 62
Type: Autonomous			
Personal work	52	2.08	1, 30, 55, 53, 51, 59, 29, 62
Preparation of essays and essay review	46.5	1.86	55, 54, 53, 9, 29

Theoretical lectures: Presentation of each theme (aims, contents, related texts). The presentation will be available at the Aula Moodle.
Practical lectures: Analysis and discussion of the theme's readings, available at the Aula Moodle.
Personal work: Guided reading of texts, study, elaboration of essays and essay review.

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
Document file	30	0	0	35, 2, 7, 27, 1, 14, 22, 23, 21, 25, 30, 5, 36, 38, 55, 54, 53, 42, 44, 45, 46, 51, 52, 8, 9, 59, 4, 29, 61, 3, 62
Essays	40	0	0	40, 1, 16, 17, 10, 12, 13, 11, 15, 18, 19, 26, 28, 24, 60, 31, 34, 30, 33, 32, 20, 37, 43, 58, 57, 41, 55, 54, 53, 48, 50, 47, 49, 51, 6, 39, 9, 56, 59, 29, 62
Part 1 exam	30	2.5	0.1	26, 30, 53, 51, 59, 62

Exam part 1. The exam will be based on the questions proposed in the Campus virtual and will refer to the texts and images discussed. The student will have to identify and explain the historical significance of some of these texts or images.
Essays. You will have to submit individually, within the deadlines indicated, 5 short texts of between 1 and 2 pages in length. You will discuss some of the questions we raise in relation to the proposed readings. We will grade the submissions and return them via the Moodle Classroom, taking into account your contribution, the comprehension of the texts, and formal aspects.
Document file. The assessment of the 2nd part of the subject consists of the selection of a source relevant to the history of contemporary mathematics and the elaboration of a document file with a predetermined structure. The source can be of different types: archival source (letter, photograph, manuscript, memoir…); printed source; object or instrument; audiovisual source. You can prepare the document file individually or in groups of two.

There will be a reevaluation exam, with a total maximum weight of 60%. To be reevaluated, you must have been evaluated in a set of activities whose weight equals to a minimum of two thirds of the total grade of the subject. The student will be deemed NOT AVALUABLE if he has not participated in all the assessment activities.

One-off assessment. The student who has taken up the One-off Assessment mode will do a final test that will consist of an exam on Part 1 and the submission of the 6 assays and the review of Part 2, with the same weight as in continuous evaluation. This test will be held on the same day, time and place as the tests for the second part of the continuous evaluation mode.

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. 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 allows the use of AI technologies as an integral part of the submitted work, provided that the final result reflects a significant contribution from the student in terms of analysis and personal reflection. The student must clearly (i) identify which parts have been generated using AI technology; (ii) specify the tools used; and (iii) include a critical reflection on how these have influenced the process and final outcome of the activity. Lack of transparency regarding the use of AI in the assessed activity will be considered academic dishonesty; the corresponding grade may be lowered, or the work may even be awarded a zero. In cases of greater infringement, more serious action may be taken.

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Software

No specific software is required.

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
(PAUL) Classroom practices	1	Catalan	second semester	morning-mixed
(SEM) Seminars	1	Catalan	second semester	afternoon
(TE) Theory	1	Catalan	second semester	morning-mixed