

History of Mathematics

Code: 106082
ECTS Credits: 6

Degree	Type	Year	Semester
2500149 Mathematics	OT	4	0

The proposed teaching and assessment methodology that appear in the guide may be subject to changes as a result of the restrictions to face-to-face class attendance imposed by the health authorities.

Contact

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Use of Languages

Principal working language: catalan (cat)
Some groups entirely in English: No
Some groups entirely in Catalan: Yes
Some groups entirely in Spanish: No

Prerequisites

The subject does not require to have taken any specific subjects of the degree.

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 analyze 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

- Actively demonstrate high concern for quality when defending or presenting the conclusions of ones 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.
- 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.

Learning Outcomes

1. Actively demonstrate high concern for quality when defending or presenting the conclusions of ones work.
2. Critically follow the arguments exposed by others.
3. Effectively use bibliographies and electronic resources to obtain information.
4. Explain and analyze the deontological code of the profession.
5. Recognize the relationships between mathematics, philosophy and culture throughout history.
6. 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.
7. Students must be capable of communicating information, ideas, problems and solutions to both specialised and non-specialised audiences.
8. Students must develop the necessary learning skills to undertake further training with a high degree of autonomy.
9. 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.
10. 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 From calculus to the culmination of a classical science

Part 2

- 6 The rise of mathematics as a profession
- 7 The foundations of mathematics
- 8 Themes of contemporary mathematics
- 9 Mathematics, gender and society in the XX century
- 10 Mathematics in Spain and Catalonia

Methodology

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. The discussion takes place before students submit the required essays, allowing them to contrast their ideas.

Personal work: Guided reading of texts, study, elaboration of essays and essay review.

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			

Practical lectures	14	0.56	1, 4, 8, 7, 6, 5, 2, 9, 10
Seminars	5	0.2	1, 8, 7, 6, 2, 3
Theoretical lectures	30	1.2	4, 5, 2, 9, 10
Type: Autonomous			
Personal work	52	2.08	1, 4, 8, 6, 5, 9, 3, 10
Preparation of essays and essay review	46.5	1.86	8, 7, 6, 2, 3

Assessment

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. For each topic, we will raise questions related to the readings proposed in the Moodle classroom. The student will write an essay of 350 words on any of these questions. The text may be discussed in the classroom before being submitted through the Aula Moodle.

Essay review part 2. consists of an essay review of a text about the history of contemporary mathematics. The essay will be 1200 words long and should clearly outline the main ideas of the chosen text and its significance for the history of mathematics. The Moodle Classroom proposes the texts that can be the subject of the review.

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.

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.

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Essay review part 2	30	0	0	1, 4, 8, 6, 5, 9, 3, 10
Essays	40	0	0	1, 4, 8, 7, 6, 5, 2, 9, 3, 10
Part 1 exam	30	2.5	0.1	4, 6, 5, 9, 10
Reevaluation exam	60	0	0	4, 8, 7, 6, 5, 9, 10

Bibliography

- Boyer, Carl B. (1968). *Historia de la matemática*. Madrid: Alianza, 1986.
- Burton, David M. (1991). *The History of Mathematics: An Introduction*. Dubuque, IA: William C. Brown.
- Calinger, Ronald ed. (1982). *Classics of Mathematics*. Oak Park, IL: Moore, 2a ed. 1995.
- Cooke, Roger (2005). *The History of Mathematics: A Brief Course*. 2nd ed. Hoboken, NJ: Wiley (online).
- Dorce, Carles (2015). *Història de la matemàtica. Des de Mesopotàmia fins al Renaixement*. Barcelona: Edicions UB.
- Eves, Howard (1976). *An Introduction to the History of Mathematics*. Philadelphia: Saunders College, 5a ed. 1983.

Fauvel, John (1987). Topics in the History of Mathematics. Unitats 1-15. Milton Keynes: The Open University.

Fauvel, John; Gray, Jeremy eds. (1987). The History of Mathematics: A Reader. Londres: MacMillan.

Ferreirós, José. Laberynth of Thought. A History of Set Theory and Its Role in Modern Mathematics. Basel: Birkhäuser (online).

Grattan-Guinness, Ivor ed. (1994). Companion Encyclopedia of the History and Philosophy of the Mathematical Sciences. Londres: Routledge.

Grattan-Guinness, Ivor (1997). The Fontana History of the Mathematical Sciences. Londres: Fontana.

Gray, Jeremy. Worlds Out of Nothing. A Course in the History of Geometry in the 19th Century. Springer. Llibre en línia UAB Biblioteques

Iliffe, Rob; Smith, George E. eds. (2016). The Cambridge Companion to Newton. 2nd ed. Cambridge: Cambridge University Press (online).

Katz, Victor J. (1993). A History of Mathematics. An Introduction. Nova York: Harper Collins, 2a ed. 1998.

Kline, Morris (1972). El pensamiento matemático de la Antigüedad a nuestros días. 3 vol. Madrid: Alianza, 1992.

MacTutor History of Mathematics Archive. University of St. Andrews (online).

Mankiewicz, Richard (2000). Historia de las matemáticas. Del cálculo al caos. Barcelona: Paidós.

Nye, Mary Jo, ed. (2003). The Modern Physical and Mathematical Sciences. Cambridge: Cambridge University Press.

Pla, Josep (2016). Història de la matemàtica. Egipte i Mesopotàmia: resultats, textos i contextos. Barcelona: IEC.

Pla, Josep (2016). Història de la matemàtica. Grècia I (de Tales i Pitàgores a Plató i Aristòtil): resultats, textos i contextos. Barcelona: IEC.

Pla, Josep (2018). Història de la matemàtica. Grècia II (els Elements d'Euclides: llibres I, II, III, IV, V i VI). Resultats, textos i contextos. Barcelona: IEC.

Struik, Dirk J. (1967). A Concise History of Mathematics. New York: Dover, 1987.

Stewart, Ian (2008). Historia de las matemáticas. Barcelona: Crítica.

Struik, Dirk J. (1969). A Source Book in Mathematics, 1200-1800. Princeton: Princeton University Press, 1986.

Stillwell, John (2010). Mathematics and Its History. 3r. ed. Berlin: Springer (online).

Smorynski, Craig (2008). History of Mathematics: A Supplement. Berlin: Springer (online).