Teaching Mathematics

Code: 44321
ECTS Credits: 15

2025/2026

Degree	Type	Year
Formación de Profesorado de Educación Secundaria Obligatoria y Bachillerato, Formación Profesional y Enseñanza de Idiomas	OP	1

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Teaching groups languages

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

Prerequisites

Mastery of the mathematics that make up the curriculum of Compulsory Secondary Education and the High School/A-level/Baccalaureate.

Objectives and Contextualisation

By the end of the Master's, students must be competent in:

Use fundamentals of mathematics didactics to interpret students' mathematical thinking in a classroom context aimed at making decisions related to the design, management, and assessment of mathematical activity occurring in the classroom.

Know and use the characteristics of mathematics learning to design, manage, and assess mathematical activities in secondary education and baccalaureate.

Know and use didactic resources to design and manage learning situations that foster mathematical thinking.

Know and interpret the curricular elements that determine how mathematics teaching should be (specific competencies, knowledge, and meanings).

Know classroom management resources to foster communication and reasoning in mathematics classes.

Know and use formative and training assessment tools that help students self-regulate their learning.

Learning Outcomes

1. CA50 (Competence) Create exemplary learning situations that promote inclusive competency-based learning in mathematics, including problem-solving activities, mathematical modelling and integration of the history of mathematics as a discipline of knowledge, among others.
2. CA51 (Competence) Apply the key aspects of educational and training assessment integrated into paradigmatic examples of the assessment of mathematics learning.

3. CA52 (Competence) Demonstrate the digital teaching competence of mathematics teachers, including the appropriate use of dynamic geometry programmes, digital measurement instruments, simulations, real-time sensors, among others.
4. KA34 (Knowledge) Describe situations with potential for improvement in the self-observation and co-observation of mathematics teaching and learning situations, whether face-to-face or video, both in real and simulated classrooms, identifying positive and problematic key aspects from the perspective of mathematics teaching.
5. KA35 (Knowledge) Remember the curricular contents of mathematics, as well as the body of teaching knowledge around the respective teaching and learning processes.
6. SA43 (Skill) Base the teaching action of design, implementation and evaluation of competency-based learning activities and situations on the knowledge and strategies of mathematics teaching.
7. SA44 (Skill) Apply the disciplinary contents and the secondary education mathematics curriculum from a literacy and educational vision for society as a whole.
8. SA45 (Skill) Evaluate scientific and educational information from the perspective of critical thinking applied to the teaching of mathematics, including the mastery and application of knowledge specific to the area of research in mathematics teaching.

Content

Contents

1. Introduction to mathematics didactics

1.1 Mathematics education
1.2 Learning mathematics
1.3 Competency-based mathematics and the new curriculum
1.4 Teaching mathematics

2. Mathematical and didactic analysis of primary education curriculum mathematical content

2.1 Plane and spatial geometry
2.2 Real and complex numbers
2.3 Measurement
2.4 Algebra: functions, equations, and inequalities
2.5 Probability and statistics

3. Design, planning, and analysis of classroom work in secondary and baccalaureate mathematics

3.1 Designing activities in the mathematics classroom
3.2 Didactic and mathematical analysis of secondary classroom situations
3.3 Designing competency-based didactic sequences in secondary mathematics classrooms

4. Problem solving

4.1 Problems and rich mathematical activities
4.2 Problem-solving heuristics
4.3 The role of communication in problem solving
4.4 Problem solving as a historical driver of the development of mathematical knowledge

5. Assessment of mathematical activity in secondary and baccalaureate classrooms

5.1 Assessment content in mathematics: concepts, processes, competencies
5.2 Forms of assessment of mathematical practices: assessment, correction, grading
5.3 Assessment moments in mathematics learning: initial, continuous, summative, final

6. Management of the mathematics classroom in secondary and baccalaureate

6.1 Classroom working methodologies to promote mathematical communication and reasoning
6.2 Resources for mathematics classroom work: technological, linguistic, manipulative, and playful
6.3 Contributions from mathematics didactics research to the design of mathematical didactic sequences

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Directed activities - Attendance and participation in lectures, laboratory practices, outings, etc., and the completion and assessment of proposed activities.	97.5	3.9	CA50, CA51, CA52, KA34, KA35, SA43, SA44, SA45, CA50
Type: Supervised			
Supervised activities - Completion, revision, and assessment of proposed tasks (reports, case studies, problem solving, presentations).	75	3	CA50, CA51, CA52, KA34, KA35, SA43, SA44, SA45, CA50
Type: Autonomous			
Autonomous activities - Analysis of readings and innovative didactic proposals, report writing, activity design, and analysis and resolution of cases.	202.5	8.1	CA50, CA51, CA52, KA34, KA35, SA43, SA44, SA45, CA50

The methodology combines directed, supervised, and autonomous activities. Students will have an active role, participating in secondary class simulations.

- Directed activities (25%)
  Attendance and participation in lectures, laboratory practices, outings, etc., and the completion and assessment of proposed activities.
- Supervised activities (5%)
  Completion, revision, and assessment of proposed tasks (reports, case studies, problem solving, presentations).
- Autonomous activities (70%)
  Analysis of readings and innovative didactic proposals, report writing, activity design, and analysis and resolution of cases.

Note: 15 minutes of one class will be reserved, within the calendar established by the institution/program, for students to complete surveys evaluating teaching performance and the course/module.

In this course, activities are proposed to develop students' DTC. In particular, the appropriate use of dynamic geometry software, digital measuring instruments, simulations, and real-time sensors, among others, will be addressed.

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
Design and implementation of rich activities in the classroom	40%	0	0	CA50, CA51, CA52, SA43, SA45
Introductory didactics assessment activity	10%	0	0	KA34, KA35, SA43, SA44
Mathematical and didactic analysis of materials and student productions	50%	0	0	KA34, KA35, SA43, SA44

To pass this course, students must demonstrate good general communication skills, both oral and written, and a good command of the Catalan language.

All tasks must be submitted within the established deadline. If not submitted on time, an additional one-week period will be enabled, but the maximum grade for each activity will be 5 out of 10.

Assessment of the course will take place throughout the academic semester through the following activities:

- Introductory didactics assessment activity (10%): This activity is carried out in pairs and must be submitted at the end of the first block on mathematics didactics.
- Mathematical and didactic analysis of materials and student productions (50%): This is an individual activity linked to the curriculum's thematic blocks and must be submitted at the end of the corresponding block.
- Design and implementation of rich activities in the classroom (40%): This group activity involves the design, implementation, and analysis of rich mathematical activities. It is also linked to the curriculum's thematic blocks and must be submitted and presented at the end of the corresponding block.

To pass the module, students must submit all assessment activities and obtain a minimum score of 5 out of 10 in each of them. If an activity is not passed, a 10-working-day period will be opened for its recovery, starting from the day the grade is communicated. If the activity to be recovered is the design and implementation of rich activities in the classroom, a 10-working-day period will be enabled for in-person recovery, starting from the end of the course teaching period.

The return of assignments and tests will be done within a maximum of 20 working days from the delivery and/or performance date.

Plagiarism is considered a serious offense. If plagiarism is detected in any assignment, it will be invalidated, must be redone, and the maximum grade willbe 5.

Correct and appropriate use of language is essential in all submissions. Language accuracy is considered in the evaluation of all assignments.

A student will receive a "not assessable" grade if they have not submitted assignments amounting to more than one-third of the final grade.

This course does not include a synthesis test in the case of a second enrollment.

For this subject, the use of Artificial Intelligence (AI) technologies is permitted exclusively for tasks authorized by the course instructor. Students must clearly identify which parts have been generated using this technology, specify the tools used, and include a critical reflection on how these influenced the process and the final result. Lack of transparency in the use of AI in assessable activities will be considered academic dishonesty and will result in a total penalty (zero) on the activity's grade.

Single assessment

Students who opt for single assessment must follow the course progression, attend classes regularly, and meet the same attendance conditions as continuous assessment students. They will submit all assessment activities individually on a single date at the end of the course period and must pass a validation test for each activity. The activities must be submitted during the last two weeks of the course calendar.

Bibliography

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Steen, L.A. i altres (2006) Las matemáticas en la vida cotidiana. Madrid: Addison-Wesley/ Universidad Autonoma de Madrid.
Varis autors (2011).Col.lecció de RBA "el mundo es matemático".Qualsevol llibre pot ser útil
Webs d' interès:

http://phobos.xtec.cat/creamat/joomla/ (CREAMAT. Centre de Recursos per ensenyar i aprendre matemàtiques. Generalitat de Catalunya. Departament d'Educació)
http://www.divulgamat.net/ (Divulgamat: Centro Virtual de Divulgación de las matemáticas).
http://nrich.maths.org/frontpage

Software

In this course, activities are proposed to develop students' DTC.

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
(TEmRD) Teoria (màster RD)	1	Catalan	annual	morning-mixed