UAB
Universitat Autònoma de Barcelona

Teaching Innovation and Introduction to Educational Research on Teaching Mathematics

Code: 45584
ECTS Credits: 10

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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Teachers

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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 Baccalaureate.

Objectives and Contextualisation

By the end of this course, students should be competent in:

Use educational innovation to diagnose problematic aspects related to student learning, identify relevant elements, design innovation proposals, and assess their impact on improving student learning.

Identify and interpret the role of the resources available for teaching and learning mathematics in Compulsory Secondary Education and Baccalaureate, justifying the suitability of their use in specific contexts.

Interpret the meaning of the specific mathematical competences defined in the curriculum, for the design and implementation of learning situations that promote deep learning of mathematics. Particular emphasis will be placed on mathematical modelling, mathematical connections, and classroom mathematical communication.

Identify and interpret the didactic suitability of learning situations designed and implemented in a mathematics classroom.

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Learning Outcomes

1. CA53 (Competence) Manage the teaching action in the school and the classroom, taking into account the characteristics of dialogic interaction, the intentionality of the questions and the role of teachers in activating and regulating mathematics learning.
2. CA54 (Competence) Integrate the values and professional commitment towards an education that contributes to the development of a sustainable, egalitarian, diverse and just society that respects human rights into the planning, design, adaptation, implementation and evaluation of sciences.
3. KA36 (Knowledge) Select the basic aspects of the curriculum and the professional and teaching knowledge of the content to plan learning situations, action strategies and evaluation strategies suitable for the teaching of mathematics from the perspective of the Universal Design of Learning.
4. KA37 (Knowledge) Identify the scientific, social and artistic knowledge necessary to analyse and design interdisciplinary classroom projects that integrate the mathematics curriculum with other subjects.
5. SA46 (Skill) Apply the gender equity perspective to educational action in the mathematics classroom, through an intersectional lens, recognising the problems of the scientific-technological field.
6. SA47 (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.

Content

1. Mathematical modelling

1.1. The concept of mathematical modelling
1.2. Mathematical models in Secondary Education
1.3. Mathematical modelling and learning situations

2. Resources for teaching mathematics

2.1. Manipulatives for teaching mathematics
2.2. Digital resources for teaching mathematics
2.3. The role of mathematics in project-based learning

3. Teaching innovation in mathematics education

3.1. The concept of innovation in mathematics education
3.2. The use of contexts in teaching mathematics
3.3. Extra- and intra-mathematical connections

4. Introduction to research in mathematics education

4.1. Criteria of didactic suitability
4.2. Data analysis and use of evidence in mathematics education

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes

Type: Directed			
Attendance and participation in lectures, lab practices, field trips, etc., and the completion and assessment of proposed activities.	65	2.6	CA53, CA54, KA36, KA37, SA46, SA47, CA53

Type: Supervised			
Completion, review, and evaluation of proposed tasks (reports, case studies, problem solving, presentations).	15	0.6	CA53, CA54, KA36, KA37, SA46, SA47, CA53

Type: Autonomous			
Analysis of readings and didactic innovation proposals, writing reports, designing activities, analyzing and solving cases.	170	6.8	CA53, CA54, KA36, KA37, SA46, SA47, CA53

The methodology combines guided, supervised, and autonomous activities. Students will take an active role.

Guided activities (25%)

Attendance and participation in lectures, lab practices, field trips, etc., and the completion and assessment of proposed activities.

Supervised activities (5%)

Completion, review, and evaluation of proposed tasks (reports, case studies, problem solving, presentations)

Autonomous activities (70%)

Analysis of readings and didactic innovation proposals, writing reports, designing activities, analyzing and solving cases.

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

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
Evaluation activity: analysis of teaching resources for mathematics education	20%	0	0	CA53, CA54, KA36, KA37, SA46, SA47
Evaluation activity: introduction to research in mathematics education	30%	0	0	CA53, CA54, KA36, KA37, SA46, SA47
Evaluation activity: mathematical modelling	20%	0	0	CA53, CA54, KA36, KA37, SA46, SA47

Evaluation activity: teaching innovation in the secondary education classroom	30%	0	0	CA53, CA54, KA36, KA37, SA46, SA47

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

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

Course assessment will be carried out throughout the academic year through the following activities:

Evaluation activity: analysis of teaching resources for mathematics education (20%) - Completed in pairs and submitted by the end of January.

Evaluation activity: mathematical modelling (20%) - Completed individually and submitted by mid-December.

Evaluation activity: teaching innovation in the secondary education classroom (30%) - Completed in pairs and submitted after the second internship period.

Evaluation activity: introduction to research in mathematics education (30%) - Completed individually and submitted at the end of the course.

To pass the module, students must submit all evaluation activities and obtain a minimum grade of 5 out of 10 in each. If an activity is failed, students will have 10 working days to resubmit it, starting from the day the grade is communicated. If the activity on the design and implementation of rich classroom activities must be resubmitted, a 10-day period for in-person resubmission will be granted, starting from the end of the course.

Feedback on assignments and tests will be provided within 20 working days after submission and/or completion.

Plagiarism is considered a serious offense: if plagiarism is detected in an assignment, it will be invalidated, must be redone, and the maximum grade will be 5.

Correct and appropriate language use is essential in all submissions. Linguistic accuracy will be considered in the evaluation of all work.

A student will be graded as *not assessable* if they fail to submit assignments that account for more than one third of the final grade.

This course does not allow a synthesis exam in the case of a second enrollment.

For this course, the use of Artificial Intelligence (AI) technologies is permitted exclusively for tasks authorized by the instructor. Students must clearly identify which parts were generated with this technology, specify the tools used, and include a critical reflection on how these influenced the process and the final result of the activity. Failure to disclose the use of AI in any assessable activity will be considered academic dishonesty and will result in a total penalty (zero) for that activity.

Single assessment

Students who opt for the single assessment must follow the course development, attending classes regularly under the same attendance conditions as students in continuous assessment. They will submit all evaluation activities individually on a single date at the end of the teaching period and must pass a validation test for each activity. The activities must be submitted during the last two weeks of the course's teaching schedule.

Bibliography

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Alsina, C., Burgués, C., Fortuny, J.M. (1991). Materiales para construir la geometria. Col·lecció Matemáticas: cultura y aprendizaje, número 11. Síntesis.

Badillo, E.; García, L.; Marbà, A. y Briceño, M. (2012). El desarrollo de competencias en las clases de ciencias y matemáticas. Universidad de los Andes.

CREAMAT Centre de Recursos per Ensenyar i Aprendre Matemàtiques (Departament d'Educació): http://phobos.xtec.cat/creamat/joomla/.

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Font, V., Calle, E., & Breda, A. (2023). Uso de los criterios de idoneidad didáctica y la metodología Lesson Study en la formación del profesorado de matemáticas en España y Ecuador. *Paradigma, 44*(2), 376-397.

Goñi, J. M. (2012) Didáctica de las matemáticas. Formación del profesorado de secundaria en matemáticas. Barcelona: Editorial Graó/Ministerio de Educación

Hernán, F., Carrillo, E. (1991). Recursos en el aula de Matemáticas. Col·lecció Matemáticas: cultura y aprendizaje, número 34. Ed. Síntesis, Madrid.

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Software

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

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.