

**Research Into Specific Ambits of Science and
Mathematics Teaching**

Code: 43929
ECTS Credits: 6

2025/2026

Degree	Type	Year
Research in Education	OP	1

Contact

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Teaching groups languages

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

Prerequisites

None

Objectives and Contextualisation

The goal of this module is to show and discuss different research perspective in science and math learning and teaching from early childhood to secondary education, as well as in the field of teacher training.

Learning Outcomes

1. CA62 (Competence) Formulate research problems on the development of competence and scientific thinking in innovative contexts while also formulating relevant questions and goals.
2. CA63 (Competence) Contrast the data from research and innovations on the development of scientific competence and thinking with the goals of the study and the corpus of available knowledge in order to draw conclusions.

3. KA61 (Knowledge) Identify lines of research in the field of the didactics of science and mathematics that address the development of scientific and mathematical competence and thinking in teachers and students.
4. KA62 (Knowledge) Identify the learning difficulties associated with scientific and mathematical competence and thinking in order to provide innovative solutions for the training of teachers and students.
5. SA47 (Skill) Produce a comprehensive review of the scientific literature in relation to a specific topic regarding learning in science and mathematics education.
6. SA48 (Skill) Analyse different kinds of data obtained from research on the development of scientific and mathematical competence and thinking.
7. SA49 (Skill) Present research on the didactics of mathematics or didactics of experimental sciences, adapting the tone to the typical type of communication in the disciplines of the didactics of sciences and mathematics.

Content

The contents will focus on the following disciplinary areas:

Development of competence and mathematical and scientific thinking
 Development of the knowledge and professional skills of mathematics and science
 Thematic axes:
 Innovation and Learning
 Representation and Communication
 Context and Critical Thinking
 Sessions:
 Modeling and conceptual ideas progression . The learning cycle as a design

Numerical representation (2 sessions)

Critical thinking (2 sessions)

The development of professional competence (2 sessions)

Evaluation

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Directed	36	1.44	CA62, CA63, KA61, KA62, SA47, SA48, SA49, CA62
Type: Supervised			
Supervised	26	1.04	CA62, CA63, KA61, KA62, SA47, SA48, CA62

Type: Autonomous

Autonomous	88	3.52	CA62, CA63, KA61, KA62, SA47, SA48, CA62
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The sessions will be based on the presentation of the main research theoretical framework and on the discussion of the results of research articles, as well as the analysis of data.

Our teaching approach and assessment procedures may be altered if public health authorities impose new restrictions on public gatherings for COVID-19

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

Continuous Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Coevaluation activity	20	0	0	CA62, CA63, KA61
Individual activity based on the content analysis	40	0	0	KA62, SA47, SA48, SA49
Individual activity based on a research article	40	0	0	CA63, KA61, KA62, SA47

1. Continuous assessment consists of 3 activities:

Activity 1: Reflection on the critical reading of a research article with the following format.

A research article about the didactics of mathematics or didactics of the sciences will be chosen, and a report will be made based on the answers to the proposed questions. The aim is to do a critical reading of the article, there is no need to answer these questions as if it were a questionnaire.

The delivery date is January 15, 2026 via CV.

1. What is the area of study? How do the authors frame it? What opinion do you think the formulation of the problem deserves?

2. What is the objective of the authors (or what are they)? Is it explicit?

3. Are there implicit assumptions?

4. What are the conclusions? Do these conclusions follow logically from the data, from the arguments? Is there an influence of the initial assumptions on the conclusions?

5. Do you agree with the conclusion presented in this article? Justify your answer

6. If you had to interview the authors, what would you ask them?

7. Have you found something surprising, new and that can change your approach to your own work?

8. Would you write an article of this type?

9. Would you like to read a sequel?

10. Would you add other questions?

Activity 2: Analysis of the progression of a certain mathematical or scientific content. The object of analysis of this work will be specified with the teaching staff of the assigned subject.

This work will be handed in by the CV and will be presented in front of the class group on March, 5th, 2026 (last session of the module).

Activity 3: Feedback on the presentation made on the progression of the content

Based on the presentations made on March 5th, 2026, an evaluation report (identifying a strong point and a point to be improved) will need to be made of one of the works presented, which will be sent to the author.

2. Non continuos assessment

Those who opt for the non continuos assessment option must make an oral presentation on the last day of class (activity 29, delivered the activity 1 as well as prepare and deliver feedback on a colleague's work).

3. Retrivement

Both in the continuous assessment and in the no continuos one, the retrivement of the suspended tasks is contemplated with a maximum mark of 5. To recover the assessment activities, it will be necessary to deliver a report justifying the changes incorporated in the activities based on the contributions provided by the teachers. The delivery period for the Virtual Campus will be one week after the delivery of the assessment.

4. Not Assessable

The non-presentation of one of the 3 assessment activities will be considered non-evaluable.

In accordance with the UAB regulations, plagiarism or copying, or use of AI without mentioning any work will be penalized with a 0 as a grade for this work, losing the possibility of recovering it.

Corrections will be returned within 20 days of delivery.

Bibliography

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Fernández, C.; Llinares, S. (2012). Características del desarrollo del razonamiento proporcional en la Educación Primaria y Secundaria. *Enseñanza de las Ciencias*, 30(1), 129-142.

Garrido, A., & Couso, D. (2025). The IPM cycle: An instructional tool for promoting students' engagement in modeling practices and construction of models. *Journal of Research in Science Teaching*, 62(2), 391-425.

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Izquierdo, M. (2005). Hacia una teoría de los contenidos escolares, *Enseñanza de las Ciencias*, 23 (1), 11-122.

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Radford, L. (2010). Algebraic thinking from a cultural semiotic perspective. *Research in Mathematics Education*, 12(1), 1-19.

Sauvé, L. (2010). Educación científica y educación ambiental: un cruce fecundo. *Enseñanza de las Ciencias*, 28 (1), 5-18

Links:

- Centre de Recursos per Ensenyar i Aprendre Matemàtiques (CREAMAT). Generalitat de Catalunya. <http://phobos.xtec.cat/creamat/joomla/>

- Freudenthal Institute. Utrecht (Nederlands). <http://www.fisme.science.uu.nl/fisme/en/>

- The Nrich Maths Project. Cambridge (UK). <http://nrich.maths.org/frontpage>

Godino, J. D., Batanero, C. & Font, V. (2003). Fundamentos de la enseñanza y el aprendizaje de las matemáticas. Departamento de Didáctica de las Matemáticas. Universidad de Granada. (Recuperable en, <http://www.ugr.es/local/jgodino/>)

Iranzo, N. (2009). Influence of dynamic geometry software on plane geometry problem solving strategies. Unpublished Doctoral Dissertation. Bellaterra, Spain: Universitat Autònoma de Barcelona. (Recuperable en, <http://www.geogebra.org/publications/2009-06-30-Nuria-Iranzo-Dissertation.pdf>)

Software

No specific software will 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
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