

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

Code: 43929
ECTS Credits: 6

Degree	Type	Year	Semester
4313815 Research in Education	OT	0	1

Contact

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Teaching groups languages

You can check it through this [link](#). To consult the language you will need to enter the CODE of the subject.
Please note that this information is provisional until 30 November 2023.

Teachers

Maria Merce Edo Baste

Josep Maria Fortuny Aymemi

Begoña Oliveras Prat

Edelmira Rosa Badillo Jimenez

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 ar
 Thematic axes:
 Innovation and Learning
 Representation and Communication
 Context and Critical Thinking
 Sessions:
 Modeling and conceptual ideas progression . The learning cycle as a des

Numerical representation (2 sessions)

Critical thinking (2 sessions)

The development of professional competence (2 sessions)

Evaluation

Methodology

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.

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Research results discussions and case analysis	0	0	
Theoretical framework discussion	0	0	

Assessment

1. Continuous assessment consists of 3 activities:

Activity 1: Questionnaire about a research article with the following format:

The student will choose a research article from the didactics of mathematics.

1. What is the area of study? How do the authors frame it? What opinion

2. The authors' objective: What is (or are)? Explicit?

3. Are there implicit assumptions?

4. What are the conclusions? Do these conclusions follow in a logical manner?

5. Suppose we have to argue for and against, would you add arguments?

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

7. Have you encountered something surprising, new, that can change your opinion?

8. Would you write such an article? Why?

9. Would you like to read a continuation? What would you expect?

10. Would you add other questions?

Activity 2: Analysis of the progression of a mathematical or scientific concept.

This work will be delivered by the CV and will be exhibited in the classroom (last session of the module).

Activity 3: Feedback Didactic analysis of a mathematical and scientific concept.

Starting from the presentations made on March 23, 2023, a forum will be created.

The authors of the presentations will have to respond to the actual feedback.

2. Unique assessment

Those students who take the single assessment option will have to give a presentation.

3. Reassessment

Both in the continuous assessment and in the single one, make-up of the assessment is possible.

In accordance with UAB regulations, plagiarism or copying, IA uses without quoted of any individual or group paper.

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
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Coevaluation activity	20	30	1.2	CA63, KA61, KA62, SA48
Individual activity based on the curricula analysis	40	60	2.4	KA62, SA47, SA48, SA49
Individual activity based on a research article	40	60	2.4	CA62, CA63, KA61, KA62, SA47

Bibliography

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Drijvers, P.; Doorman, M.; Boon, P.; Reed, H.; Gravemeijer, K. (2010). The teacher and the tool: instrumental orchestrations in the technology-rich mathematics classroom. *Educational Studies in Mathematics*, 75, 213-234.

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

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Vermillion, P.; Rabardel, P. (1995). Cognition and artifacts: A contribution to the study of thought in relation to instrumented activity. *European Journal of Psychology of Education*, 10(1), 77-101.

Enllaços web:

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

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

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

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Software

No specific software will be used