UAB
Universitat Autònoma de Barcelona

Design and Evaluation of Teaching and Learning of Sciences and Mathematics in Context

Code: 45013
Credits: 6

2026/2027

Degree programme	Type	Course
Research in Education	OP	1

Contact lecturer

Name : Èlia Tena Gallego

Email : elia.tena@uab.cat

Teaching staff

Genaro De Gamboa Rojas

Neus Banqué Martínez

Group languages

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

Prerequisites

None

Objectives

Taking into account the learning acquired in previous modules, this module will explore in greater depth the design of different projects and teaching proposals that enable the contextualised integration of science and mathematics teaching and learning. Emphasis will also be placed on how to assess these proposals by adopting an applied qualitative research approach.

By the end of the module, students are expected to be able to:

- Understand the role of contexts in projects and teaching proposals for the integration of science and mathematics teaching, especially in relation to STEM and connections.
- Become familiar with and identify rigorous research in the field of interdisciplinary and STEM/STEAM, including critical reflection on gender-related issues in these areas.
- Become familiar with and identify research related to research-based design for the iterative improvement of learning situations in science and mathematics education.
- Identify key elements of mathematical and scientific communication and reasoning in order to develop projects and solve problems in context.

- Become familiar with and identify digital tools specific to the teaching and learning of science and mathematics, as well as research linked to the use of digital tools in these areas.
- Become familiar with and apply assessment criteria and processes to learning situations in order to promote contextualised science and mathematics teaching, as well as research linked to the assessment of learning situations in these areas.
- Evaluate and design competence-based educational proposals with a focus on improving learning situations for the contextualised teaching of science and mathematics.

Learning outcomes

- CA64 (Study the relevant aspects of the contexts of science and mathematics education, and analyse them as research objectives in order to formulate questions and goals based on them.) Study the relevant aspects of the contexts of science and mathematics education, and analyse them as research objectives in order to formulate questions and goals based on them.
- CA65 (Adopt innovative approaches to assessment in order to make proposals for improvement and innovation projects on the teaching of science and mathematics in context.) Adopt innovative approaches to assessment in order to make proposals for improvement and innovation projects on the teaching of science and mathematics in context.
- KA63 (Describe the different theoretical frameworks of reference that guide research and innovation in science and mathematics education based on socially and environmentally relevant contexts.) Describe the different theoretical frameworks of reference that guide research and innovation in science and mathematics education based on socially and environmentally relevant contexts.
- KA64 (Identify lines of research on the teaching of science and mathematics in context from the relevant professional sources.) Identify lines of research on the teaching of science and mathematics in context from the relevant professional sources.
- KA65 (Identify problem areas in innovation on science and mathematics education in context and assess which methodological approaches might help to resolve them.) Identify problem areas in innovation on science and mathematics education in context and assess which methodological approaches might help to resolve them.
- SA50 (Create relevant research and innovation designs in relation to science and mathematics education in context.) Create relevant research and innovation designs in relation to science and mathematics education in context.
- SA51 (Plan research while taking into account the potential and limitations of digital tools for teaching science and mathematics in context.) Plan research while taking into account the potential and limitations of digital tools for teaching science and mathematics in context.
- SA52 (Report the conclusions of research on innovations, the knowledge generated and the ultimate supporting reasons to specialised and non-specialised audiences in a clear and unambiguous manner.) Report the conclusions of research on innovations, the knowledge generated and the ultimate supporting reasons to specialised and non-specialised audiences in a clear and unambiguous manner.

Contents

This module will address, in a cross-cutting way, some of the main processes related to science and mathematics education, such as school projects, learning technologies, classroom communication, problem-solving and assessment, as well as research in these areas.

Some of the central topics will be:

- Contextualisation and interdisciplinary in the teaching of science and mathematics, especially in STEM.
- STEM identities in the classroom.
- Mathematical communication aimed at promoting mathematical reasoning around specific curriculum content.
- Formative, learning-oriented and summative assessment throughout the science and mathematics learning process.
- The assessment of learning situations from the perspective of Design-Based Research.
- The use of digital tools in the design of contextualised projects in science and mathematics.

Learning activities and methodology

Title	Hours	ECTS	Learning outcomes
Reading papers	28	1.12	
Analysis and group discussion of papers	16	0.64	
Production of papers / group work	60	2.4	
Tutorials	10	0.4	
Classroom practices	18	0.72	
Lectures	18	0.72	

The learning activities will be developed through the following dynamics:

- Lectures / taught sessions delivered by the teaching staff
- Reading of articles and documentary sources
- Classroom practice: solving problems, cases and exercises, and self-reflection activities
- Presentation / oral presentation of assignments
- Tutorials

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	Weight	Hours	ECTS	Learning outcomes
Evaluation of an interdisciplinary project (including the design of a competency-based assessment question) Group work presentation	45%	0	0	CA64, CA65, KA63, SA51, SA52
Individual reflection document based on the improvement proposals received from the evaluation of a project (also supporting some of the reflections with theoretical references analyzed throughout the module)	45%	0	0	KA63, KA64, KA65, SA50
Participation in class and in a Moodle forum (minimum 80% attendance)- Individual	10%	0	0	CA65, KA63, SA52

In order to access assessment, students must attend 80% of the module sessions. Students' participation and engagement in the proposed activities and in the development of the working dynamics will be assessed.

Three assessment activities are proposed:

- Task A: Evaluation of an interdisciplinary project, including the design of a competence-based assessment question or activity - Presentation of the group work. Submission date: 27 May 2027.
- Task B: Individual reflection document based on the improvement proposals received from the evaluation of a project, supporting some of the reflections with the theoretical references analysed throughout the module- Individual. Submission date: 4 June 2027.
- Task C: Participation in the Virtual Campus forum - Individual. Participation is expected to be continuous throughout the module. Forum closing date: 4 June 2027.

Recovery/Make-up exam: In order to recover continuous assessment activities, students must submit a report justifying the changes incorporated into the activities on the basis of the teaching staff's feedback. The maximum mark that can be obtained in the recovery task is five (5.0). The submission deadline via the Virtual Campus will be 9 June 2027.

Single assessment: Students must submit a single document containing the three continuous assessment activities of the module individually:

- Task A: Evaluation of an interdisciplinary project, including the design of a competence-based assessment question or activity.
- Task B: Individual reflection document on the improvement proposals for the evaluated project (Task A), supporting some of the reflections with the theoretical references analysed throughout the module.
- Task C: Participation in the Virtual Campus forum. A single document must be submitted responding to all the reflections proposed in the forum.

The activities will be submitted and defended orally on 27 May 2026, from 17:30 to 21:00. The recovery of the single assessment will consist of submitting a report justifying the changes incorporated into the activities on the basis of the teaching staff's feedback during the oral defence. The recovery submission must be made via the Virtual Campus and the deadline will be 9 June 2026.

When the student has not submitted at least Task A and Task B, they will be considered non-assessable.

Plagiarism

In accordance with UAB regulations, plagiarism or copying in any assignment, or the use of AI without acknowledgement, will be penalised with a mark of 0, with no possibility of recovery, whether the assignment is individual or group-based. In the case of group work, all members of the group will receive a mark of 0.

Use of Artificial Intelligence (AI) technologies

In this course, the use of artificial intelligence (AI) technologies is permitted exclusively in the tasks authorised by the course lecturer. Students must clearly identify which parts have been generated using this technology, specify the tools used and include a critical reflection on how these tools have influenced the process and the final outcome of the activity. Failure to be transparent about the use of AI in this assessable activity will be considered a breach of academic honesty and will result in a full penalty, that is, a mark of zero for the activity.

Bibliography

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Software

No specific software is required.

Course groups and languages

The information provided is provisional until November 30. After this date, you will be able to consult the language of each group through this link. To access the information, you will need to enter the course CODE

Type of teaching	Group	Language	Semester	Shift
(TEm) Theory (master)	1	Catalan	second semester	afternoon