

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

Code: 45013

ECTS Credits: 6

Degree	Type	Year	Semester
4313815 Research in Education	OT	0	2

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

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Prerequisites

None

Objectives and Contextualisation

This module tackles some of the main transversal processes related to science and mathematics education, such as practical work, school projects, ICTs for learning and communication in schools, problem solving and assessment. Having into account learnings from previous modules, the focus of this one will be on the design of context-based educational instruction that facilitates the integration of STEM areas. Emphasis will be also put on how to evaluate teaching proposals taking into consideration a design-based research approach. The following contents will be discussed:

- Contexts for integrating science and maths teaching
- Learning to solve mathematical problems in context
- Inquiry and practical work to teach context-based science
- Affordances and constraints of the use of ICTs in contextualised projects
- Teachers' pedagogical content knowledge in relation with science and maths teaching
- Assessment as a tool to promote contextualised science and maths teaching

Learning Outcomes

- CA64 (Competence) 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 (Competence) 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 (Knowledge) 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 (Knowledge) Identify lines of research on the teaching of science and mathematics in context from the relevant professional sources.
- KA65 (Knowledge) Identify problem areas in innovation on science and mathematics education in context and assess which methodological approaches might help to resolve them.
- SA50 (Skill) Create relevant research and innovation designs in relation to science and mathematics education in context.
- SA51 (Skill) Plan research while taking into account the potential and limitations of digital tools for teaching science and mathematics in context.
- SA52 (Skill) 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.

Content

- Contextualization and interdisciplinarity in the teaching of science and mathematics.
- Scientific model-based inquiry in relevant contexts.
- Mathematical modeling from relevant contexts.
- Digital tools for the teaching of science and mathematics.
- Models of professional knowledge of the teacher and Resolution of mathematical problems in relevant contexts.
- Formative assessment throughout the learning process of the sciences and mathematics.
- The assessment to qualify the learning of science and mathematics.
- The external evaluation of the teaching of science and mathematics.

Methodology

The training activity will be developed based on the following dynamics:

- Readings of articles and document collections
- Lectures by teachers
- Analysis and collective discussion of articles and document collections
- Classroom practices: problem solving / cases / exercises
- Presentation of works
- 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.

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Classroom practices	18	0.72	CA64, CA65, KA63, KA64, KA65, SA50, SA51, SA52, CA64
Lectures	18	0.72	CA64, CA65, KA63, KA64, KA65, SA50, SA51, SA52, CA64
Type: Supervised			
Analysis and group discussion of papers	16	0.64	CA64, CA65, KA63, KA64, KA65, SA51, CA64
Tutorials	10	0.4	CA64, CA65, KA63, KA64, KA65, SA50, SA51, SA52, CA64
Type: Autonomous			
Production of papers / group work	60	2.4	CA64, CA65, KA63, KA64, KA65, SA50, SA51, SA52, CA64
Reading papers	28	1.12	CA64, CA65, KA63, KA64, KA65, SA52, CA64

Assessment

To access the assessment, attendance at 80% of the module sessions will be required. Students' participation ar

Three evaluation activities are proposed:

- Evaluation of an interdisciplinary project (including the design of a comp
- Individual reflection document based on the improvement proposals rec
- Participation in the forums on the Virtual Campus. Delivery date: June 1

Recovery: To recover the continuous assessment activities, it will be necessary to submit a report justifying the cl

Single assessment: A single document will be delivered with the three continuous assessment activities of the mod

Plagiarism or copying will result in failure and will be reported to the degree coordinator.

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
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Evaluation of an interdisciplinary project	45%	0	0	CA64, CA65, KA63, KA64, KA65, SA50, SA51, SA52
Individual reflection document	45%	0	0	CA65, KA65, SA50, SA51, SA52
Participation	10%	0	0	CA64, CA65, KA63, KA64, KA65, SA50, SA51, SA52

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Software

No specific software is required