UAB
Universitat Autònoma de Barcelona

Management and Innovation in the Mathematics Classroom

Code: 102059
ECTS Credits: 5

2024/2025

Degree	Type	Year
2500798 Primary Education	OB	3

Contact

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Teachers

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Teaching groups languages

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

Prerequisites

This course requires some basic knowledge of mathematics, equivalent to that achieved with the secondary-school mathematics. It is recommended to have taken and passed the subjects: "Mathematics for Teachers" (first course) and "Learning mathematics and curriculum" (second course). It is important to have an open and critical approach that allows seeing mathematics from different perspectives. Discriminatory attitudes or behaviors will not be accepted, and the inclusive use of language will be ensured.

Objectives and Contextualisation

Compulsory third year course that focuses on the development of skills of teaching and mathematical analyses, based on real situations of primary mathematics classrooms, to allow to design, manage and evaluate innovative, interdisciplinary and inclusive mathematical activities.

Recommendation of having completed the compulsory subjects: "Mathematics for teachers" and "Learning mathematics and curriculum". *Management and innovation in mathematics classroom* aims at enacting the ability to relate and integrate the knowledge students have constructed in the former subjects of mathematics and mathematics education that is needed for teaching mathematics at primary school.

This course develops practical knowledge and application of mathematics curriculum in the planning, the design and the assesment of activities and sequences of teaching and learning mathematical contents in the primary school, exemplifying the following curricular mathematical content:

1. Geometry: geometric transformations, symmetry and similarity.

2. Rational numbers: decimals and operations, representations and concept of fraction.

3. Measure: quantities and units of measurement, measurement procedures. Proportionality.

The following objectives are specified:

1. Knowing theoretical elements to analyze educational situations of teaching and learning mathematics in primary school

2. Acquiring professional skills of didactical and mathematical analysis. In the design, planning, management and evaluation of teaching and learning sequences (involving numbers, measurement and geometry)

3. Understanding and analyzing teaching situations, interdisciplinary and innovative situations, identifying mathematical and other contents.

4. Encouraging innovative aspects of mathematics classroom management and use of educational resources.

5. Designing interventions for teaching mathematics in primary school, based on the curriculum and their theoretical guidelines.

Competences

- Analyse, reason and communicate mathematical proposals.
- Critically analyse personal work and use resources for professional development.
- Design and regulate learning spaces in contexts of diversity that take into account gender equality, equity and respect for human rights and observe the values of public education.
- Design, plan and evaluate education and learning processes, both individually and in collaboration with other teachers and professionals at the centre.
- Incorporate information and communications technology to learn, communicate and share in educational contexts.
- Know the curricular areas of Primary Education, the interdisciplinary relation between them, the evaluation criteria and the body of didactic knowledge regarding the respective procedures of education and learning.
- Reflect on classroom experiences in order to innovate and improve teaching work. Acquire skills and habits for autonomous and cooperative learning and promote it among pupils.
- Take account of social, economic and environmental impacts when operating within one's own area of knowledge.
- Value the relationship between mathematics and sciences as one of the pillars of scientific thought.

Learning Outcomes

1. Analyse an educational situation for the teaching of mathematics, individually or in groups, to assess its relevance and make innovative alternative proposals.
2. Design and justify didactic situations from their curriculum and theoretical guidelines.
3. Design innovative didactic sequences for the teaching of mathematics, based on the use of contexts and analysis of phenomena that science provides.
4. Establish concrete relations by means of educational proposals in the different areas of the primary education curriculum.
5. Identify the social, economic and environmental implications of academic and professional activities within one?s own area of knowledge.
6. Identifying and creating good mathematical practices.
7. Identifying mathematical aspects in daily life and promoting their use in the design of mathematical activities.
8. Propose ways to evaluate projects and actions for improving sustainability.

9. Recognising the contributions of professional skills, mathematical skills and didactic analysis skills to the making of decisions about the design, management and evaluation of learning sequences of innovative mathematics in elementary classes.
10. Reflecting on classroom practices based on the use of new information and communication technology in order to innovate and improve the teaching task.
11. Understand and apply indicators for the evaluation and design of proposals for mathematics education from a perspective of gender equity and equality.
12. Understand and critically evaluate educational software and adequate websites for the teaching and learning of mathematics.
13. Understand interdisciplinary teaching situations for the teaching and learning of mathematics.
14. Using a variety of materials and methodologies for learning mathematics, especially in the contents of numbers, geometry and measurement.

Content

1. Mathematical and didactic analysis of school mathematics contents of primary education

   1.1. Geometry: geometric transformations, symmetry and similarity.

   1.2. Rational numbers: decimal numbers and operations, representations and conceptof fractions.

   1.3. Measure: quantities and units of measurement, measurement procedures. Proportionality.

2. Design, planning and analysis of work in primary mathematics classrooms

   2.1. To design activities for the mathematics classroom.

   2.2. To analyse the pedagogy and mathematics of primary classroom situations.

   2.3. To design didactic sequences to promote mathematics competences in the primary school classroom

3. Management and innovation in the mathematics classroom primary

   3.1. Methodologies for the work in the classroom: projects, problem solving and collaborative work environments.

   3.2. Resources for the work in mathematics classroom: technologies, languages, manipulatives and games.

4. Evaluation of mathematical activity in the primary classroom

   4.1. Mathematics assessment: concepts, processes, skills.

   4.2. Methodes to evaluate mathematical practices: assessment, correction, rating.

   4.3. Moments of assessment in learning mathematics: initial, continuing, summative, final.

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Classroom course. Major group.	25	1	2, 6

Exposure Seminars. Small group.	4	0.16	2, 6
Seminars. Small group.	5	0.2	2, 6
Technology seminars. Small group.	4	0.16	
Type: Supervised			
Assessment final test activities.	5	0.2	
Tutoring sessions.	20	0.8	
Type: Autonomous			
Students work on written reports and oral exposures.	62	2.48	

The student will attend weekly sessions in large group and seminars in small group. The large sessions group, led by the teacher, will be dedicated to the analysis and discussion of real situations of learning and teaching mathematics classroom in primary school. Besides, there will be work on mathematical concepts and ideas that emerge from the teaching situations.

To help to develop professional skills of teaching and mathematical analysis, seminars in small group will be based on the analysis of real situations of primary mathematics classrooms, linked to the specified mathematical contents. Seminars will facilitate the design, management and evaluation of innovative, interdisciplinary and inclusive mathematical activities. Also, seminars will enhance small group within the oral processes of the design and analysis of the sequences teaching programs in mathematics at the primary stage prepared.

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
Individual work: evaluation tests.	50%	0	0	11, 12, 2, 4, 6, 10
Working in groups: Didactic and mathematical analysis of mathematical situations and resources in primary classroom	30%	0	0	1, 11, 12, 13, 2, 3, 4, 7, 6, 5, 8, 9, 10, 14
Working in pairs: design of a didactic sequence of mathematics, which involves blocks of primary education content	20%	0	0	11, 12, 13, 2, 3, 4, 7, 6, 9, 10, 14

The evaluation of the course will be held throughout the first semester by the activities shown below.

Attendance to the classes is compulsory.

The assessment of the subject will be carried out throughout the academic semester through the activities indicated below:

- Didactic and mathematical analysis of teaching and learning cases: first week of November.
- Design of a teaching sequence: first week of December.
- Final written test: last academic week of December.

All tasks must be submitted within the established period. If they are not submitted within the established period, an additional period of one week will be allowed, but the assessment of each activity will have a maximum limit of 5 out of 10. The deadlines for submitting the activities and for returning corrections by the teaching staff will be specified in the course programme. However, the returns may never be later than 20 working days from submission.

RESIT: Students who have a grade higher than 3.5 but less than 5 in the final exam may take a resit test (weighted 50% - replacing the final exam grade). The resit test will be held the week of 01/13/2025 depending on the day of the week that the group has classes for this subject. Group and pairs work may also be resit with a maximum grade of 5, and must be handed in on the same day as the resit test.

It is essential a correct and proper use of language in all the works. Linguistic correctness is considered in the evaluation of all these works.

Total or partial plagiarism of one of the evaluation activities or copy in an assessment test is a direct reason for suspending the subject, following the criteria and guidelines for evaluation of the Faculty.

The marking of a working group is not necessarily the individual grade of all students in this group. The individual assessment in a working group is determined by the evidence of learning of each individual in the group.

For the final test,it is necessary to obtain at least a score of five over ten.

For the formative evaluation activities, it is necessary to obtain at least five over ten in all of them.

A student receives rating of not evaluable if a task has not been presented or the individual test has not been completed.

This subject does not consider the option of single evaluation.

Bibliography

Castelnuovo, E. (1981). *La matemática/La geometria*. Ketres Editora.

Chamorro, M. C. (2003). *Didáctica de las Matemáticas para Primaria*. Pearson Educación.

NCTM (2003). *Principios y estándares para la educación matemàtica*. Sociedad Andaluza de Profesores de Matemáticas.

Segovia, I., L. Rico. (2011). *Matemáticas para maestros de Educación Primaria*. Ediciones Pirámide.

TAL Team (2001). *Children learn mathematics*. Freudenthal Institute and National Institute for Curriculum Development.

TAL Team (2005). *Young children learn measurement and geometry*. Freudenthal Institute and National Institute for Curriculum Development.

Smith, M. & Stein, M. K. (2018). *5 Practices for orchestrating productive mathematics discussion*. National Council of Teachers of Mathematics.
NCTM (2015). *Principles to actions: Ensuring mathematical success for all*. Reston, VA: NCTM.

Webpages

https://projectes.xtec.cat/nou-curriculum/educacio-basica

https://serveiseducatius.xtec.cat/cesire/finestra/matematiques

http://www.urg.es/local/jgodino/edumat-maestros

http://www.geogebra.org/cms

http://www.fi.uu.nl/rekenweb/en

http://www.fi.uu.nl

http://www.nctm.org/standards/content.aspx?id=26885

http://recursostic.educacion.es/gauss/web/materiales_didacticos/primaria/actividades/novedades.htm

http://www.edu365.cat/aulanet/intermates

http://puntmat.blogspot.com.es

Software

To be decided

Language list

Name	Group	Language	Semester	Turn
(SEM) Seminars	211	Catalan	first semester	morning-mixed
(SEM) Seminars	212	Catalan	first semester	morning-mixed
(SEM) Seminars	213	Catalan	first semester	morning-mixed
(SEM) Seminars	311	Catalan	first semester	morning-mixed
(SEM) Seminars	312	Catalan	first semester	morning-mixed
(SEM) Seminars	313	Catalan	first semester	morning-mixed
(SEM) Seminars	411	Catalan	first semester	afternoon
(SEM) Seminars	412	Catalan	first semester	afternoon
(SEM) Seminars	413	Catalan	first semester	afternoon
(SEM) Seminars	711	English	first semester	afternoon
(SEM) Seminars	712	English	first semester	afternoon
(SEM) Seminars	713	English	first semester	afternoon
(TE) Theory	21	Catalan	first semester	morning-mixed

(TE) Theory	31	Catalan	first semester	morning-mixed
(TE) Theory	41	Catalan	first semester	afternoon
(TE) Theory	71	English	first semester	afternoon