UAB
Universitat Autònoma de Barcelona

Mathematics for Understanding the World

Code: 102056
ECTS Credits: 6

2024/2025

Degree	Type	Year
2500798 Primary Education	OT	4

Contact

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Teaching groups languages

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

Prerequisites

It is suggested that the students that enroll in this subject have studied and passed the first year subject "Mathematics for teachers", the second course subject: "Learning mathematics and curriculum" and the third course subject "Management and innovation In the classroom of mathematics ".
To pass this subject, the student must show, in the activities proposed, good general communicative competence, both orally and in writing, and a good command of the language or the vehicular languages that appear in the teaching guide.

Objectives and Contextualisation

This is an optional fourth year subject that is focused on the development of professional competencies around mathematics and its ability to understand the world around us. This subject should provide tools and strategies for teachers who want to study in depth the mathematics teaching and their relationship with the world, from the perspective of the application of mathematics to the physical or natural world and sociocultural as well as from The perspective of inspiration in both worlds to inspire / create mathematics and design, manage and evaluate interventions in the classroom of primary math according to these references.
It is taught when the students have already completed the compulsory subjects: Mathematics for teachers, Mathematics and curriculum development, and Management and innovation in the classroom of mathematics, and who wish to study or study as a free-choice subject, or Well to get the mention in didactics of mathematics.
For this reason, from the subject Mathematics to understand the world, we want to focus on the knowledge of the world that surrounds us (both physical and natural and social) from the point of view of mathematics, to provide tools to offer Resources and strategies that allow future teachers to present a mathematics meaningful, useful and meaningful in primary.
This course develops the practical knowledge and application of the primary mathematical curriculum in the planning, design and evaluation of tasks and sequences of teaching and learning of mathematical contents. It works on numbering and calculations, relations and change, space and form, measurement, and statistics and chance to understand the world around us and have didactic tools to design interventions in the classroom of primary math. However, this does not mean that the mathematical processes and contents that work should be limited solely to those of the primary curriculum, but that the teacher should achieve the mathematical competences necessary to interpret Part of the world that surrounds itand to know how to limit itself and adapt to the level of primary when it comes to taking them to the classroom. The teacher must know more about what pupils need to learn.
The following specific objectives are specified:
1. To know different applications of mathematics from the point of view of the socio-cultural environment as

well as physical / natural.
2. Design interventions for the teaching of mathematics in primary school based on these applications.
3. To design, plan, manage and evaluate teaching and learning activities of mathematics based on the criteria set by the primary curriculum.
4. Work on the mathematical contents of the environment using efficient didactic methodologies.
5. Understand the role of the world that surrounds us (natural and sociocultural) in order to create mathematics in a way that is opposite to that of the aforementioned application.
6. Knowing mathematical ideas from other cultural worlds present in primary classrooms.

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 and apply information and communication technologies to classrooms.
- Know how primary schools are organised and about the diversity of actions involved in running them.
- 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.
- Maintain a critical and autonomous relationship with respect to knowledge, values and public, social and private institutions.
- Posing and solving problems related to daily life.
- 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.
- Stimulate and value effort, constancy and personal discipline in 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. Adapt teaching and learning programs and activities to pupil diversity.
2. Analyse social and historical facts and collect various interpretations of the relationship between mathematics and other sciences. Understand the positive or distorting role of the media in the use of these relationships.
3. Analyse the goals of mathematics education at different stages of primary education.
4. Analyse the indicators of sustainability of academic and professional activities in the areas of knowledge, integrating social, economic and environmental dimensions.
5. Assessing the value of, and applying professional cases relating to, the teaching of mathematics.
6. Design innovative teaching sequences from contexts that provide recreational mathematics.
7. Design teaching and learning sequences that connect different mathematical topics.
8. Gaining a deeper knowledge of school mathematics at a level of level connections, contexts and skills.
9. Identify the social, economic and environmental implications of academic and professional activities within one?s own area of knowledge.
10. Identifying, designing and communicating concepts, facts and phenomena of different sciences capable of being modelled using mathematical concepts.
11. Propose viable projects and actions to boost social, economic and environmental benefits.
12. Propose ways to evaluate projects and actions for improving sustainability.
13. Understand and critically evaluate educational software and related web-based resources in the gaming world that are suitable for teaching and learning mathematics.

14. Understand recreational didactic situations involving mathematics, both inside and outside the classroom, to promote independent learning and cooperative work.

Content

The teacher's mathematical competence must not be reduced to what his students must achieve, but rather must go further. The contents of the subject are determined by two aspects.
On the one hand, by the desire to understand some current phenomena in contemporary life and environment. On the other, the desire to bring some in the classroom, turning them into mathematical education and learning activities so that primary school students learn mathematics and understand better the world in which they live. From the point of view of the teaching methodologies for the Primary School, the course aims to integrate mathematical work into the work dynamics of projects, focusing on the competence of solving contextualized problems and mathematical modeling.

There are various conceptions of mathematical modeling but it is widely shared to consider mathematical modeling as a problem-solving process that links the real world and mathematics.
Modeling involves mathematizing real-world situations and elaborating mathematical models to describe the phenomena studied, often conceptualized as the result of having engaged in a complex modeling process. The phenomena that will be studied and will conform the contents of the subject will be:

Count to know
How are we?, how are they? How are I?
Identification and creation of numerical and geometric patterns
Unreacheable magnitudes

Living the measurement
What does it mean to measure?
Walk in space and in time
Measure of uncertainty

How many ways can you do it?
Group yourself
QR codes
Go from one place to another

Mathematics to everyday contexts
Video games
Tiles the plan
Mosaics: a universal cultural phenomenon

Mathematical photography
Images that are not understood without mathematics

Mathematics for ...
Get Informed (media)
Get to know the city (mathematical itineraries)
Enjoy (games and sports)
Bringing a healthy life (health and consumption)
Work (workplace)

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes

Type: Directed			
Big group	45	1.8	1, 8
Type: Supervised			
Supervised	30	1.2	1, 8
Type: Autonomous			
Autonomous	75	3	

The main character in the teaching-learning process is the student and under this premise.

Exhibitions on basic themes of the syllabus (31 hours): it is done with the entire class group through an open and active participation by students.

When a return is needed, it will begin with an introduction where the lessons of the previous seminar will be shared. It will end with the presentation of the tasks that must be developed at the seminar and individually.

Work spaces in small groups within the classroom supervised by the teacher where through the analysis of documents or activities of research and use of manipulatives, it approaches the contents and topics worked in the large group and prepare the projects (14 hours).

Criteria of inclusion and respect for the different diversities always represented in any classroom, including the university classroom, will be considered.

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
Project 1: Individual work	30%	0	0	1, 3, 8, 14, 7, 6
Project 2: Working in groups	40%	0	0	1, 4, 3, 2, 13, 7, 6, 9, 10, 12, 11, 5
Project 3: Individual work	30%	0	0	1, 4, 3, 2, 7, 6, 9, 12, 11, 5

The evaluation of the subject will be carried out throughout the academic year through the activities that are shown in the previous grid. Deliveries of each of the works are scheduled for March 17 (indivual), May 19 (group) and June 16 (individual), 2025.

Class attendance is mandatory: the student must attend all classes to be evaluated. A maximum of 20% incidents are contemplated. Otherwise, it will be considered not submitted to the ordinary evaluation.

To pass the assessment, the student must meet the following two requirements: i) obtain a minimum grade of 5 in the overall assessment; ii) obtain an average higher than 5 in the two individual papers. There will only be recovery for individual jobs. If the rating of an individual work is lower than 5, the students will have to redo it so that it can be evaluated again. The catch-up delivery date for individual papers is 30 June 2025.

Copying or plagiarizing material in any assessment activity involves a zero in the subject.

To pass this course, the student must show a good general communicative competence, both orally and in writing, and a good command of the language or languages spoken in the teaching guide. In all the activities (individual and in group) will take into account, therefore, the linguistic correction, the writing and the formal appearances of presentation. Students must be able to express themselves fluently and correctly and must show a high degree of comprehension of academic texts. An activity can be returned (not evaluated) or suspended if the teacher considers that he / she does not meet these requirements.

Single evaluation

Students who take the single assessment must follow the development of the subject, attending class regularly. However, DO NOT SUBMIT THE FOLLOW-UP ASSESSMENT ACTIVITIES OF THE BLOCK UNTIL THE SAME DAY OF THE FINAL ASSESSMENT. Forthis reason, they will NOT have individualized RETURN of the monitoring evaluation activities of the blocks during the development of the subject. In any case, they will be able to access the return of a general nature, whether it is what is done during the return sessions for the whole class group or those that can be published on the virtual campus that is done by the group.

The same evidence will be collected as for the continuous assessment, except that for this modality the three works will be individual and must be delivered through the virtual campus space coinciding with the date of the last class session of the subject (June 16, 2025). The recovery system will be the same as for the continuous assessment.

Dates to take into account

Activities submission: 16th June 2025.

Single and continuous assessment recovery delivery: 30th June 2025.

Bibliography

Recommendations

Albarracín, L., & Ärlebäck, J. B. (2022). Esquemas de resolución de problemas de Fermi como herramienta de diseño y gestión para el profesor. *Educación Matemática, 34*(2), 289-309.

Albarracín, L., Badillo, E., Giménez, J., Vanegas, Y. & Vilella, X. (2018). *Aprender a enseñar matemáticas en la educación primaria*. Editorial Síntesis.

Albarracín, L., Gorba, A., & Gorgorió, N. (2022). Un proyecto de modelización matemática para aprender a ir seguros a la escuela. *UNO-Revista de Didáctica de las Matemáticas, 95*, 64-69.

Albarracín, L., & Gorgorió, N. (2014). Devising a plan to solve Fermi problems involving large numbers. *Educational Studies in Mathematics, 86*(1), 79-96.

Alsina, À. & Planas, N. (2008). Matemática inclusiva: Propuestas para una educación matemática accesible.

Blanco, L. J. et al. (Coords.) (2022). Aportaciones al desarrollo del curriculo desde la investigación en educación matemática. Universidad de Granada.

Gómez, C., & Albarracín, L. (2017). Estimación de grandes cantidades, en primaria. *UNO-Revista de Didáctica de las Matemáticas, 76*, 57-63.

Planas. N. (Coord.) (2010). Pensar i comunicar matemàtiques. Fundació Propedagògic i Associació de Mestres Rosa Sensat.

Software

No specific software is used.

Language list

Name	Group	Language	Semester	Turn
(TE) Theory	20	Catalan	second semester	morning-mixed