

Mathematics for Teachers

Code: 102055
ECTS Credits: 6

Degree	Type	Year	Semester
2500798 Primary Education	OB	1	2

Contact

Name: Núria Gorgorió Solà
Email: Nuria.Gorgorio@uab.cat

Use of languages

Principal working language: catalan (cat)
Some groups entirely in English: Yes
Some groups entirely in Catalan: Yes
Some groups entirely in Spanish: No

Teachers

Núria Gorgorió Solà
Romà Pujol Pujol
Marc Guinjoan Francisco
Gemma Valero Martinez
Lluís Albarracín Gordo

Prerequisites

To follow the course it's required to have a good basic level in mathematics, equivalent to the subjects of math in secondary education.

Objectives and Contextualisation

It is a basic subject of disciplinary content. The aim is to strengthen the basic mathematical knowledge through various methods: problem solving, research and projects, among others. Achieving this subject should serve as a basis for building the knowledge of the teaching of mathematics throughout the degree. The basic mathematical knowledge built on this subject will lay in the groundwork for future teachers to guide students in primary education towards achieving the mathematics skills of the stage

The following are the specific objectives of the subject:

- Managing the initial mathematical knowledge to approach it to the basic mathematical knowledge for teaching.
- Contextualising mathematical knowledge in mathematics teacher's tasks.
- Opposing mechanistic learning of mathematics to construction of knowledge.
- Establishing connections between different mathematical concepts.
- Understanding mathematics as a valuable tool to solve problems beyond the mathematics classroom.

Skills

- Acquire basic mathematics skills (numerical skills, calculation, geometry, spatial representations, estimation and measurement, organisation and interpretation of information, etc.).
- 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.
- Develop autonomous learning strategies.
- Incorporate information and communications technology to learn, communicate and share in educational contexts.
- Know and apply information and communication technologies to classrooms.
- 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.
- Stimulate and value effort, constancy and personal discipline in pupils.
- Value the relationship between mathematics and sciences as one of the pillars of scientific thought.

Learning outcomes

1. Being able to solve problems involving the connection between different blocks of content.
2. Critically analyse mathematical texts, activities and other proposals for education.
3. Demonstrate knowledge of the fundamental concepts and properties of number systems, plane and space geometry, measurement and data treatment.
4. Exploit situations from a particular scientific field to show the utility of mathematical content.
5. Find information using technologies for learning and knowledge resources in mathematics.
6. Identifying problem situations drawn from other sciences that can be modelled mathematically.
7. Posing problems in order to introduce relevant mathematical concepts and results.
8. Resolving problems independently.
9. Resolving problems involving names, geometry and measurement in a variety of situations including those from everyday life.
10. Using software tools and specific maths programs for estimating, demonstrating and communicating mathematical results.
11. Using virtual platforms as a communication and management tool for directed and supervised activities.

Content

1. Geometry to understand space.

Elementary geometric constructions. Plain representation of space.

2. Numbers to count and calculate.

Natural numbers. Decimal numbering system. Divisibility.

3. Measure to know the environment.

Concept of magnitude. Proportionality.

4. Data for interpreting reality.

Organization, interpretation and visualization of data. Probability

The following are considered transversal contents relevant to all the content mentioned before:

5. Display and representation of ideas and mathematical concepts.
6. Problem solving.
7. Patterns and relationships.

Methodology

The teaching methodology proposal is based on active learning in the classroom. All tasks are organized under the concept of education based on giving students the opportunity to discover mathematical concepts and properties by themselves and under a constructivist conception of teaching mathematics.

It is expected that the student, independently, take responsibility extend their mathematical knowledge base.

The student must comply with precise punctuality tasks properly proposed to continue the teaching the subject.

Activity analysis and Problem solving

Small or large group sessions where problems are solved and class situations are analyzed from the point of view of mathematical content involved in the subject. Students are responsible for the work orally present their work and the teacher will validate the mathematical knowledge that involved the active participation of other students.

Lectures

Exposition by the teacher of the main contents of the course in which students are expected to participate actively.

Practices

Small group work sessions where proposed research activities that students solved guided by the teacher.

Activities

Title	Hours	ECTS	Learning outcomes
Type: Directed			
Activities analysis and problem solving	75	3	2, 4, 3, 6, 7, 8, 9, 1
Classroom practice	30	1.2	2, 5, 6, 1, 10, 11
Master class	45	1.8	2, 4, 6, 7

Evaluation

Basic mathematical knowledge test as a requirement for assessment:

During the course, students must pass a Basic mathematical knowledge test with a minimum score of 7 out of 10. Students have three opportunities to pass it: at the beginning, middle and end of the semester.

The test aims to verify that the student has achieved a good level of basic mathematics, particularly mathematics proper to compulsory education, which are a prerequisite for assessment of the subject.

Description of the assessment activities:

Planning, resolution and reporting of activities and/or problems: During the course, problems and other mathematical activities will be proposed in the working seminars. Students in class will present orally their work and deliver a written report. Occasionally, short activities to be delivered at the end of the class will be given to students.

Practices. It raises two practical activities that require developing critical reading of one or more texts.

Individual written tests: During the course will be one or more individual written tests. Some of these tests may be partial and tie contents of a part of the course. The grade of each of these tests should be 5 and will not be a recovery test for them.

Considerations assessment:

Students must take into account the following considerations regulations on the assessment:

- All evaluations tasks are mandatory.
- The activities are part of the continuous assessment must be delivered on deadlines. The not delivered activities will have a mark of zero in evaluation.
- Plagiarism or copying of any material evaluation activity implies a zero on the whole subject.
- Attendance at classes of the course is required. Must attend 80% of classroom hours to be evaluated in the course.
- The mark of a working group is not necessarily the individual note of each group of students.

Evaluation activities

Title	Weighting	Hours	ECTS	Learning outcomes
Individual written tests	50	0	0	3, 8, 9, 1
Planning, solving and reporting of problems and/or activities	30	0	0	5, 3, 7, 8, 9, 1, 10, 11
Practices	20	0	0	2, 4, 5, 6

Bibliography

ALEKSANDROV, A.D. et al. (1973) La matemática: su contenido, métodos y significado Vol 1. Alianza. Madrid.

CASTELNUOVO, E. (1981) La geometría. Ketres. Barcelona.

Castro, A., Mengual, E., Prat, M., Albarracín, L., Gorgorió, N. (2014). Conocimiento matemático fundamental para el grado de educación primaria: inicio de una línea de investigación. En M. T. González, M. Codes, D. Arnau y T. Ortega (Eds.), Investigación en Educación Matemática XVIII (pp. 227-236). Salamanca: SEIEM.

COURANT, R. & ROBBINS, H. (1955) ¿Qué es la matemática?. Aguilar. Madrid.

DEULOFEU, J. (2001) Una recreación matemática: Historias, juegos y problemas. Planeta. Barcelona.

FISHER, R. VINCE, A. (1988) Investigando las Matemáticas. Akal. Madrid.

GARDNER, M. (1983) ¡Ajá! Paradojas. Labor. Barcelona.

GODINO, J. D. & RUÍZ, F. (2003). Geometría y su didáctica para maestros. Departamento de Didáctica de las Matemáticas. Universidad de Granada. ISBN: 84-932510-1-1. (<http://www.ugr.es/local/jgodino/>)

Gorgorió, N., Albarracín, L., & Villareal, A. (2017). Examen de competència logicomatemàtica en la nova prova d'accés als graus de mestre. Noubiaix: revista de la FEEMCAT i la SCM, 58-64.

KLINE, M. (1974) La naturaleza de las matemáticas. Introducció de Matemáticas en el mundo moderno. Selecció de M. Kline. Blume. Barcelona.

MASON, J., BURTON, L. & STACEY, K. (1988) Pensar matemáticamente. Labor-MEC. Barcelona.

Mengual, E., Gorgorió, N. and Albarracín, L. (2017) Análisis de las actividades propuestas por un libro de texto: El caso de la medida. REDIMAT, 6(2), 136-163

NCTM (2003) Principios y estándares para la educación matemática. SAEM Thales. Sevilla.

Pizarro, N., Gorgorió, N., Albarracín, L. (2014). Aproximación al conocimiento para la enseñanza de la estimación de medida de los maestros de primaria. En M. T. González, M. Codes, D. Arnau y T. Ortega (Eds.), Investigación en Educación Matemática XVIII (pp. 523-532). Salamanca: SEIEM.

PIZARRO, N., GORGORIÓ, N. & ALBARRACÍN, L. (2016) Caracterización de las tareas de estimación y medición de magnitudes. Números, (91), 91-103.

PONCARÉ, H. (1974) La creación matemática. extret de Matemáticas en el mundo moderno. Selecció de M. Kline. Blume. Barcelona.

POLYA, G. (1982) Cómo plantear y resolver problemas. Trillas. México.

RICO, L. (2011) Matemáticas para maestros de educación primaria. Pirámide. Madrid.