

Mathematics Learning and Curriculum

Code: 102061
ECTS Credits: 6

Degree	Type	Year	Semester
2500798 Primary Education	OB	2	2

Contact

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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

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Prerequisites

This course requires a basic level of mathematics equivalent to that achieved in Secondary Education (12-16). Moreover, as we know that mathematics has often been seen as a set of formulas and techniques, it is important that students enrolling in this course have an open and critical attitude with this view, developing a new approach to mathematics from different perspectives. It is strongly recommended that students have passed the course "Mathematics for teachers".

Objectives and Contextualisation

The purpose of this course is to acquire a deep knowledge of the mathematical content in the Primary School Curriculum. Several curricular documents will be analyzed in order to show the students different resources that allow them to contextualize the mathematical knowledge in their future teaching. In addition to providing students with educational tools to develop basic mathematical content, this course also aims to provide them with methodological tools that allow them to create rich educational activities that could be applied for teaching other subjects. The specific objectives of this subject are:

1. Understanding different frames of reference for mathematics curricula and learn to interpret them.
2. Acquiring didactical and professional knowledge of the processes involved in the learning of mathematics, in particular, the connections that exist between mathematical ideas and also between mathematic and other areas. In this regard, it is also important to be aware of the connection between the patterns in our environment and mathematical structures.
3. Acquiring didactical knowledge of the appropriate teaching materials to carry out, asses and interpret mathematical tasks in geometry and numbers, encouraging imagination and visual thinking.

Skills

- Be familiar with the mathematics curriculum.
- 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 and evaluate contents of the curriculum by means of appropriate didactic resources and promote the corresponding skills in pupils.
- Develop autonomous learning strategies.
- 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.
- Value the relationship between mathematics and sciences as one of the pillars of scientific thought.

Learning outcomes

1. Critically evaluate maths experiences, materials and teaching proposals.
2. Establish concrete relations by means of educational proposals in the different areas of the primary education curriculum.
3. Have solid knowledge of the teaching of arithmetic and geometry.
4. Meet all the objectives, content, process and criteria for specific evaluation in the area of mathematics in primary education.
5. Possess indicators to evaluate and design proposals for mathematics education from the perspective of gender equity and equality.
6. Recognising the contributions of mathematical skill to the core skills as a whole.
7. Recognising the potential of new technologies for attending to the diversity of levels of learning mathematics.
8. Understand and critically evaluate educational software and adequate websites for the teaching and learning of mathematics.
9. Using a variety of materials professionally for learning mathematics, especially in the fields of geometry and numbers.
10. Using virtual platforms as a communication and management tool for directed and supervised activities.

Content

1. The mathematics curriculum

1.1 Structure of the current curricular documents in mathematics

1.2 Contrast between different curricular documents.

1.3 Analysis of the mathematical content in the curriculum.

1.4 The dimensions of the mathematics curriculum (Transversal axis)

1.4.1 Problem Solving

1.4.2 Representation and communication

1.4.3 Connections

1.4.4 Reasoning and proof

2. Curriculum's organization: Numbers and calculation

2.1 Numbers to count and calculate. Decimal numeral system.

2.2 Situations and problems of arithmetic: additive thinking. Calculation by counting. Calculation by structuring. Formal calculation.

2.3 Situations and problems of arithmetic: multiplicative thinking. Acquiring basic skills and properties.

2.4 Use of algorithm and reasoned calculation.

2.5 Estimation and approximation. Numerical sense.

2.6 Exact calculation, written calculation and calculator.

2.7 Analysis of class situations, textbooks and TAC (Technologies for learning and communication) applications.

3. Curriculum's organization: Space and shape

3.1 Knowledge of flat shapes: lines, polygons and puzzles. Classifications using basic elements of geometry.

3.2 Relationship 2D-3D. Orientation on the plane and space. Labyrinths, roads and coordinates.

3.3 Study of shape. Geometric solids. Construction of polyhedra and 3D puzzles. Curves and generation of solids of revolution.

3.4 Use of different materials for the teaching of geometry.

3.5 Analysis of class situations, textbooks and TAC (Technologies for learning and communication) applications.

Methodology

The protagonist in the learning process is the student, and under this premise methodology has been planned.

Activities

Title	Hours	ECTS	Learning outcomes
Type: Directed			
Oral presentation in small groups	6	0.24	1, 4, 7, 6
Whole group session	24	0.96	4, 5, 6
Workshop in small group	15	0.6	4, 8
Type: Supervised			
Individual or small group tutorials	30	1.2	5, 3
Type: Autonomous			
Individual work	75	3	1, 4, 3, 6

Evaluation

Attendance at classes of the course **is required**. You must attend at least **80%** of classroom hours to be evaluated in the course.

All evaluation activities carried out throughout the course **must be submitted by the deadline** in the syllabus. It is **not possible to retake** any of them. If not delivered within the deadline, the evaluation of this activity will be automatically a **zero**.

Plagiarism of all or part of an assessment activity and / or the copy of any of the assessment activities **is a direct cause to fail the course.**

The mark in a group activity doesn't have to be the same for all the members of the group. The evaluation process in a single working group is determined by the evidence of learning of each member of the group.

In relation to the final exam, **students must obtain at least a 5.** It is not possible to resit the final exam.

In relation to the training assessment activities, students must have obtained, at least, **an average mark of 5 to pass the course.**

In case you fail the final exam and/or the training assessment activities the final mark will be 4, if the final average mark is greater than 4, or the final average mark if it is lower than 4.

Evaluation activities

Title	Weighting	Hours	ECTS	Learning outcomes
Activity in pairs: analysis and creation of mathematical activities.	10%	0	0	1, 4, 2, 7
Group activity: Summaries for Numbers, Geometry and Processes.	15%	0	0	1, 8, 5, 2, 6, 10, 9
Individual final exam	50%	0	0	1, 4, 8, 5, 3, 2, 9
Oral presentations in group	20%	0	0	1, 8, 6, 9
Report on an excursion to MMACA.	5%	0	0	1, 5, 2, 7, 10, 9

Bibliography

Books of reference

Burgués, C. (2013). Competències bàsiques de l'àmbit matemàtic. Identificació i desplegament a l'educació primària. Generalitat de Catalunya. Departament d'Ensenyament.

NCTM. (2003). Principios y estándares para la educación matemática. Granada: Sociedad Andaluza de Profesores de Matemáticas.

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

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