UAB
Universitat Autònoma de Barcelona

2020/2021

Mathematics Learning and Curriculum

Code: 102061
ECTS Credits: 6

Degree	Type	Year	Semester
2500798 Primary Education	OB	2	2

The proposed teaching and assessment methodology that appear in the guide may be subject to changes as a result of the restrictions to face-to-face class attendance imposed by the health authorities.

Contact

Name: Genaro de Gamboa Rojas

Email: Genaro.DeGamboa@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

Laura Morera Ubeda

Nuria Planas Raig

Edelmira Rosa Badillo Jiménez

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.

Competences

- 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.

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

Assessment

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 within the deadline in the syllabus. 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 order to pass the subject, it is necessary to obtain at least a 5 in the individual written exam, and to have an average mark equal to or greater than 5 in the rest of the tasks.

Exam resit: Students who have a grade of more than 3.5 but do not achieve a grade of 5 in the final exam may retake the exam. This exam will be held one week after the ordinary exam. The maximum grade in a resit exam is 5.

Tasks repetition (summaries and task in pairs): Students who having passed the exam do not achieve a grade of 5 can submit again, individually, all the failed tasks. The maximum grade in a resit task is 5.

Students who have to submit again any task besides resitting the exam should notice that repeated tasks would be only corrected in case of passing the exam resit.

The overall grade of the course is the weighted average of all the assessment activities and the grade obtained in the final exam or in the exam resit.

Passing the exam is a condition for having a weighted average mark.

Students who have failed the exam can have a maximum final mark of 4.

If, having passed the exam, the result of the weighted average does not reach 5, the overall grade is the weighted average mark.

Oral presentations cannot be repeated.

Assessment dates

Analysis of a problem: end of the fifth week

Workshop submissions:

- Curriculum: end of bloc 1

- Numbers and operations: end of bloc 2

- Geometry: the day before the exam

Exam: fifteenth week (there may be midterm exams)

Resit examinations and activities: sixteenth week

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Activity in pairs: competential analysis of children's resolutions.	15%	0	0	1, 4, 2, 7
Group activity: Workshops about Curriculum, Numbers and Geometry.	20%	0	0	1, 8, 5, 2, 6, 9

Individual final exam.	50%	0	0	1, 4, 8, 5, 3, 2, 9
Oral presentation in group.	15%	0	0	1, 8, 6, 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.