UAB
Universitat Autònoma de Barcelona

Mathematics Learning and Curriculum

Code: 102061
ECTS Credits: 6

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Degree	Type	Year
2500798 Primary Education	OB	2

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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 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.
- 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.
- 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. Establish concrete relations by means of educational proposals in the different areas of the primary education curriculum.
2. Have solid knowledge of the teaching of arithmetic and geometry.
3. Identify the social, economic and environmental implications of academic and professional activities within one?s own area of knowledge.
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. Propose ways to evaluate projects and actions for improving sustainability.
7. Recognising the contributions of mathematical skill to the core skills as a whole.
8. Recognising the potential of new technologies for attending to the diversity of levels of learning mathematics.
9. Understand and critically evaluate educational software and adequate websites for the teaching and learning of mathematics.

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 Processes in the mathematics curriculum

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

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Classroom practices	30	1.2	4, 9, 5, 8, 7
Masterclass	15	0.6	4, 2, 7
Type: Supervised			
Individual or small group tutorials	15	0.6	5, 2
Project development and problem solving	15	0.6	4, 9, 5, 2, 1, 3, 8, 7
Type: Autonomous			
Individual work	75	3	4, 2, 7

The teaching proposal is based on a methodology of active and face-to-face work in the classroom. At the same time, students must complete the proposed tasks punctually in order to adequately follow the teaching of the subject. The student has to work bearing in mind that learning mathematics requires daily practice and that mathematics is not learnt by watching or seeing how someone else does mathematics. Learning is based on DOING mathematics, showing a pro-active attitude.

The specific assessment activities and the criteria for grading them will be the same for everyone enrolled in the course. In Mathematics, the result of each activity or problem can be arrived at in different ways. This premise is what allows us to promote an inclusive vision of mathematics learning.

With regard to the gender perspective, and in line with the proposals of the Observatory for Equality of the UAB, this subject works explicitly with materials and knowledge produced by women scientists.

Development of projects and problem solving

Work sessions in small or large groups where problems are solved and projects are developed related to the mathematical contents involved in the course. The students responsible for the task will present their work orally and the teacher will validate the mathematical knowledge involved with the active participation of the rest of the students.

Master classes

Presentation by the lecturer of the main contents of the course with the active participation of the students.

Practical or research work

Small group work sessions in which research activities are proposed and students complete them under the guidance of the lecturer.

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
Group activity: Workshops about Curriculum, Numbers and Geometry.	20%	0	0	9, 5, 1, 3, 6, 7
Individual final exam	50%	0	0	4, 9, 5, 2, 1
Planning, resolution and reporting of activities	15%	0	0	4, 9, 5, 2, 1, 6, 8, 7
Project planning, development and reporting	15%	0	0	9, 3, 6, 7

The student has to work bearing in mind that learning mathematics requires daily practice. Learning is based on mathematical DOING, showing a pro-active attitude. Students are expected to take responsibility for expanding and consolidating their basic mathematical knowledge in an autonomous manner.

The specific nature of some of the assessment activities will depend on whether the student takes the continuous assessment or the single assessment. The assessment criteria will be the same for all those enrolled on the course.

TYPOLOGY AND WEIGHT OF ASSESSMENT ACTIVITIES:
There are different types of assessment activities:
- Planning, resolution and report of activities: a series of linked mathematical activities will be proposed to be developed in small groups, which will be presented and discussed in seminars (15% of the mark for the course).
- Planning, development and project report. The students, organised in small groups, will be asked to plan and develop a geometry project to be presented to the rest of the classmates (15% of the course mark).
- Individual resolution test: For the first two blocks of the course (Block I: Curriculum; Block II: Numeracy and Calculus), students must take an individual follow-up test (20% of the course mark).

Continuous assessment students will do the individual resolution test one week after completing Block II of Numeracy and Calculus, as well as the completion of the activities. Teachers will publish the dates of the test and the follow-up examinations of the blocks when publishing the programme, as the dates depend on the timetable of the blocks.

In the case of students who take the single evaluation, they must submit the written report of the activity and/or project and they must complete a written activity to validate the report they have submitted. The delivery of the reports and the validation tests will take place on the day of the final evaluation.

FINAL TEST: Two weeks afterfinishing the course there will be an individual final test of the whole course content (50% of the course mark). The date of the final exam is the week of 18/06/2025 according to the day of the week that the group takes the course.

RECUPERATION TEST: Those students who have a mark higher than 3.5 in the final exam but do not get a mark of 5 can take a RECUPERATION test (50% weight - in substitution of the mark of the final exam). The make-up test will take place two weeks after the final test, on the week of 02/07/2025 according to the day of the week that the group is taught in this subject.

Note: Only the final exam can be recuperated. You will not be able to recuperate the partial test of the first two blocks, nor the group work.

CALCULATION OF THE MARK FOR THE COURSE

The final grade for the course is the weighted average of the marks obtained in the assessment activities of the first two blocks (20%), of the Planning, resolution and report of activities (15%), of the Planning, development and project report of the geometry block (15%), and of the mark obtained in the final exam or the recuperation exam (with a weight of 50%), subject to the following conditions:

- in order to be eligible to obtain a weighted average with the rest of the marks of the course, the student must have obtained a minimum mark of 5 in the final test or the recuperation test. If the student does not obtain a minimum of 5 in the final exam or in the recuperation test, he/she does not pass the course and the final qualification of the course will be a 3
- late submission of the evaluation activities will result in a 0 in the evaluation of the same.
- non-attendance at the follow-up test of the first two blocks will result in a 0 in the evaluation of the same.
- the evaluation activities cannot be recuperated in any case, apart from the written test.
- despite having passed the final test or, if applicable, the recuperation, if the weighted average of the marks does not reach5, the student does not pass the course and the final mark on their transcript will be a 3.

OTHER CONSIDERATIONS ON THE EVALUATION

Students must take into account the following normative considerations regarding the evaluation:
- In individual written tests it is not allowed to use the calculator, unless indicated by the teacher.
- The use of Artificial Intelligence tools is not allowed in the evaluation activities.
- All evaluation activities are compulsory for all students.
- The mark for a group work is not necessarily the individual mark of each student in the group.
- Students who do not attend the seminar sessions during the development of the assessment activities of a block will have a maximum mark of 5 for those activities.
- The copying or plagiarism of material in any assessment activity implies a 0 in the course.

ATTENDANCE AND EVALUATION

The course is face-to-face. Students who do not attend the seminar sessions during the assessment activities will receive a maximum mark of 5 out of those sessions. This consideration applies to both continuous evaluation students and single evaluation students.

CONTINUOUS EVALUATION
The examinations and the test corresponding to the continuous evaluation of the first two blocks will take place one week after the end of the block, as established below (type and weight of the evaluation activities).
The dates set for the final exam and the recuperation exam are the same as those established for all students enrolled in the course.

SINGLE EVALUATION

Students who take the single evaluation must follow the development of the course, attending class regularly. However, they WILL NOT PRESENT THE FOLLOW-UP EVALUATION ACTIVITIES UNTIL THE SAME DAY OF THE FINAL EXAM. For this reason, they will NOT HAVE ANY individualised RETURN of the follow-up evaluation activities during the development of thecourse. In any case, they will be able to access the general feedback, either that which is done during the feedback sessions to the whole class or that which is published on the virtual campus by the group.

Specific to students taking the single evaluation is the date of collection of the evaluation evidence and the requirement for a test to validate the evidence collected. The teaching team of the course considers it necessary to carry out a validation test of the evidence collected because the students will have access to the process of returning the activities and the project and to the corrected evidence of their classmates.

The date for the deliveries and the tests for the validation and the test of the first two blocks is the same as that established for the final test, the week of 18/06/2025 according to the day of the week that the group takes this subject.

Therefore, on the week of 18/06/2025, depending on the day of the week that the group takes this subject, students taking the single evaluation will have to:
- Do the same final test and at the same time as the rest of the people in the course; the same conditions will apply to the recuperation test if necessary.
- Take an individual written test to evaluate the first two blocks.
- Complete the evaluation activities and take the validation test.
- Complete the geometry project and take the validation test.

Students who have been accepted to a single evaluation with a mark higher or equal to 3.5 and lower than 5 can take a recuperation test, which will be the same for all the students of the course and will be held on the same day (the week of 02/07/2024 according to schedule).

The weight of the evaluation of the different blocks and of the final test (or in its case the recuperation) and the calculation of the final mark of the course are the same for all the students of the course, even if they have taken a single evaluation. The other specific considerations regarding evaluation also applyto both continuous evaluation students and single evaluation students.

It is essential that students taking the single evaluation reserve the ENTIRE DAY of the final EVALUATION in order to have time to complete all the tests that will constitute their evaluation evidence.

ATTENTION REPEATERS:

From the academic year 2023-24, there will be NO EVALUATION OF SYNTHESIS for this subject. Therefore, those enrolling for the second time will be able to choose between a continuous EVALUATION or a single evaluation.
In both cases, the conditions regarding attendance will be the same as those applicable to the applicable are the same as for the rest of the students enrolled in the course. Therefore, we recommend that students repeating the course ensure that they have the time available to follow it regularly, if necessary, avoiding enrolling in other courses taught on the same day at the same time slot.

NOTE: In order to pass this course, it is necessary to show a good general communicative competence, both orally and in writing, and a good command of the language or languages listed in the teaching guide. In all activities (individual and group), therefore, linguistic accuracy, writing and formal aspects of presentation will be taken into account. You must be able to express yourself fluently and correctly and show a high level of understanding of academic texts. An activity may be returned (not evaluated) or failed if it is considered that it does not satisfy these requirements.

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.

Software

In this subject it is necessari to have access to a basic text processor, a presentation tool, spreadsheets and a pdf reader. Some free software (e.g. Geogebra) can be used under teacher's judegement. It is no necessary to buy or get any particular license.

Language list

Name	Group	Language	Semester	Turn
(SEM) Seminars	211	Catalan	second semester	morning-mixed
(SEM) Seminars	212	Catalan	second semester	morning-mixed
(SEM) Seminars	311	Catalan	second semester	morning-mixed
(SEM) Seminars	312	Catalan	second semester	morning-mixed
(SEM) Seminars	411	Catalan	second semester	afternoon
(SEM) Seminars	412	Catalan	second semester	afternoon
(SEM) Seminars	711	English	second semester	afternoon
(SEM) Seminars	712	English	second semester	afternoon
(TE) Theory	21	Catalan	second semester	morning-mixed
(TE) Theory	31	Catalan	second semester	morning-mixed
(TE) Theory	41	Catalan	second semester	afternoon
(TE) Theory	71	English	second semester	afternoon