

Games and Mathematical Activities in Primary Education

Code: 102058
ECTS Credits: 6

Degree	Type	Year	Semester
2500798 Primary Education	OT	4	0

Contact

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Use of Languages

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

Prerequisites

It is suggested that students enrolled in this subject have completed and passed the following subjects:

"Mathematics for teachers", first course,
"Mathematics and curriculum development", second year
"Management and innovation in the math classroom", third year.

Objectives and Contextualisation

TARGETS

- Know, contextualize, practice and classify the main abstract games from all over the world.
- Discover the relationships between games and mathematics, so that those provide an adequate context and constitute significant resources for teaching mathematics in Primary Education.
- Analyze and design game contexts for the different levels of Primary Education, in accordance with the mathematical strategies and contents that arise in their resolution.
- Understand the context of the game as a fun and enriching activity that allows to show a positive vision of mathematics and at the same time make cooperative work possible.

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.

- 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 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.
- 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.
- 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 the goals of mathematics education at different stages of primary education.
3. Design innovative teaching sequences from contexts that provide recreational mathematics.
4. Design teaching / learning strategies in which the assumptions of personal decisions are prioritized, and the identification of relevant information for individual projects.
5. Design teaching and learning sequences that connect different mathematical topics.
6. Develop mathematical content from the primary curriculum based on the use of mathematical games and recreations.
7. Develop strategies for autonomous learning.
8. Identifying, designing and communicating concepts, facts and phenomena of different sciences capable of being modelled using mathematical concepts.
9. Understand and critically evaluate educational software and related web-based resources in the gaming world that are suitable for teaching and learning mathematics.
10. Understand recreational didactic situations involving mathematics, both inside and outside the classroom, to promote independent learning and cooperative work.
11. Understand, appreciate and apply mathematical games in teaching and learning in this field.

Content

1. Introduction:

1.1. Mathematics playful and math "serious".

1.2. Mathematical activity, games and mathematical recreations throughout history.

1.3. The application of games to decision-making: competitive games and collaborative games. The dilemmas

2. Board games and problem solving

2.1. Strategy games (Games of alignments, Search games, Games of connections, Games of Mancala)

2.2. The determination of winning strategies: The small strategy games (Nim and Nimbus games)

2.3. Other board games (games on paper and various pawn games).

3. Games with random intervention

3.1. Systems to generate situations of chance

3.2. Traditional games and probability

4. Mathematical recreations, a resource for the classroom: Enigmas and recreational problems

4.1. Numerical recreations

4.2. Geometric recreations

4.3. Logical recreations

5. Learning mathematics and recreational activities

Methodology

The protagonist in the teaching-learning process is the student and it is under this premise that it has been planned

the methodology of the subject as shown in the table below:

Activity	Horas	Methodology
Presencial en gran grupo	15	Exhibitions by the teacher
	12,5	
	12,5	Analysis of board games (small group)
	5	
	5	Mathematical recreation workshop (small group)
		Sessions in the computer room (analysis of resources in the network)

Since this is an optional subject, all face-to-face sessions will be with the entire class group.

However, as indicated in the methodology, there will be sessions where a small group work will be carried out in the classroom under the supervision of the teacher.

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Directed	45	1.8	9, 10, 11, 6, 7, 3
Type: Supervised			
Tutorials and follow-up	23	0.92	9, 10, 11, 6, 7, 3
Type: Autonomous			

Assessment

The evaluation of the subject will be carried out throughout the academic year through the activities that are shown on the grid.

Class attendance is mandatory: the student must attend all classes to be evaluated (20% of incidents are contemplated);

Otherwise it will be considered not presented.

The student who has not submitted all the assessment activities within the established deadlines will also be considered as not present.

It is necessary for the student to have from each one of the sections of the assessment a grade of at least 5 (4 in the case of the final test),

to be evaluated globally.

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Design of activities	25%	2	0.08	1, 9, 10, 11, 6, 7, 3
Design recreational practice	15%	1	0.04	6, 5, 3, 8
Final test	35%	2	0.08	9, 10, 11, 6, 7, 3
Practice of analyzing a text	15%	1	0.04	2, 7, 4
asistence and participation	10%	1	0.04	9, 10, 11, 6, 7, 3

Bibliography

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- Corbalán, F. (1994) *Juegos matemáticos para secundaria y bachillerato*. Madrid: Síntesis.
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- Deulofeu, J. (2010) *Prisioneros con dilemas y estrategias dominantes. Teoría de juegos*. Barcelona: RBA
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- Guzman, M. (2003) *Cuentos con cuentas*. Madrid: Nívola
- Wells, D. (1992) *The penguin book of curious and interesting puzzles*. Londres: Penguin Books

Enllaços web:

Jareño, Joan. Calaix +ie. <http://xtec.cat/~jjareno/>

Jareño, Joan. Blog del Calaix +ie. <http://calaix2.blogspot.com.es/>

Jareño, Joan. Càlculs. <http://xtec.cat/~jjareno/calculus/>

NRICH Enriching Mathematics. <http://nrich.maths.org/frontpage>

CREAMAT. Centre del Departament d'Ensenyament. Generalitat de Catalunya.
<http://srvcnpps.xtec.cat/creammat/joomla/>

DIVULGAMAT. Centro de Divulgación de las Matemáticas. RSME. <http://www.divulgamat.net/>