Universitat Autònoma de Barcelona

2022/2023

Games and Mathematical Activities in Primary Education

Code: 102058
ECTS Credits: 6

Degree	Type	Year	Semester
2500798 Primary Education	OT	4	1

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.
- 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.
- 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. Adapt teaching and learning programs and activities to pupil diversity.
2. Analyse the goals of mathematics education at different stages of primary education.
3. Analyse the indicators of sustainability of academic and professional activities in the areas of knowledge, integrating social, economic and environmental dimensions.
4. Design innovative teaching sequences from contexts that provide recreational mathematics.
5. Design teaching and learning sequences that connect different mathematical topics.
6. Identify the social, economic and environmental implications of academic and professional activities within one?s own area of knowledge.
7. Identifying, designing and communicating concepts, facts and phenomena of different sciences capable of being modelled using mathematical concepts.
8. Propose viable projects and actions to boost social, economic and environmental benefits.
9. Propose ways to evaluate projects and actions for improving sustainability.
10. Understand and critically evaluate educational software and related web-based resources in the gaming world that are suitable for teaching and learning mathematics.
11. Understand recreational didactic situations involving mathematics, both inside and outside the classroom, to promote independent learning and cooperative work.
12. 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	Analysis of board games (small group)
	12,5	
	5	Mathematical recreation workshop (small group)
	5	Sessions in the computer room (analysis of resources in the network)
		Student exhibitions and other evaluation activities

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.

The proposed teaching methodology and evaluation may undergo some modification depending on the face-to-fa

The proposed methodology assumes a face-to-face development of the subject. It would be done with videoconf

If it were necessary to return to a confinement, everything would be done through teams and the virtual campus,

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.

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Directed	45	1.8	10, 11, 12, 4
Type: Supervised			
Tutorials and follow-up	23	0.92	10, 11, 12, 4
Type: Autonomous			
Autonomous	75	3	10, 11, 12, 4

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.

In the case of having to alter the methodology for health reasons, the evaluation activities will be the same, but those that require attendance will be adapted to the virtual format.

The delivery dates of the evaluation activities are:

Author Analysis Practice: October 17, 2022
Design practice and recreation typology resolution: November 14, 2022
Final test: December 19, 2022
Classroom activity design work: January 9, 2023
In case of not passing any of the evaluation activities there will be a reco

Activitat d'Avaluació	% de la nota

Class attendance and participation (individual)	10
Practice of analysis of an author, a book article and a typology of games (individual)	15
Practice of design and resolution of a typology of recreations for the classroom of mathematics (in pairs)	15
Mathematical activity design work for the primary classroom (in small groups). Oral presentation of the work (in small groups)	25
Final Test (individual)	35

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Design of activities	25%	2	0.08	1, 10, 11, 12, 4, 6, 8
Design recreational practice	15%	1	0.04	5, 4, 7
Final test	35%	2	0.08	3, 10, 11, 12, 4, 9
Practice of analyzing a text	15%	1	0.04	2
asistence and participation	10%	1	0.04	10, 11, 12, 4

Bibliography

- Bell,R., Cornelius, M. (1990) *Juegos con tablero y fichas*. Barcelona: Labor.

- Berloquin, P. (1976) *100 Jeux de table.* Paris: Flammarion.

- Comas, O. (2005) *El món en jocs.* Barcelona: RBA-La Magrana.

- Corbalán, F. (1994) *Juegos matemáticos para secundaria y bachillerato*. Madrid: Síntesis.

- Corbalán, F. (1996) *Números, cultura y juegos*. Madrid: Videocinco.

- Deulofeu, J. (1999) Recreaciones, juegos y actividades matemáticas, *UNO*, 20, 89-101.

- Deulofeu, J. (2001) *Una recreación matemática: historias, juegos y problemas.* Barcelona: Planeta.

- Deulofeu, J. (2003) *131 juegos matemáticos*. Barcelona: Martínez Roca

- Deulofeu, J. (2010) *Prisioneros con dilemas y estrategias dominantes. Teoría de juegos*. Barcelona: RBA

- Fomín, et al. (1998) *Mathematical Circles.* USA: American Mathematical Soc.

- Gardner, M. (1981) *Inspiración !Ajá!* Barcelona: Labor

- Gardner et al. (1990) *La mathematique des jeux.* Paris: Pour la Science

- Grunfeld (1978) *Juegos de todo el mundo.* Madrid: UNICEF-Edilan

- 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. Càlculus. http://xtec.cat/~jjareno/calculus/

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

CREAMAT. Cesire del Departament d'Ensenyament. Generalitat de Catalunya. http://srvcnpbs.xtec.cat/creamat/joomla/

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

Software

No specific software will be used unless, in accordance with the different types of game-based learning activities, the relevant software is indicated in each case, which can be accessed, free of charge, through of the network