

**Mathematics on the Early Childhood Education Curriculum**

Code: 101986  
ECTS Credits: 4

Degree	Type	Year	Semester
2500797 Early Childhood Education	OB	3	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

Despite not being any official prerequisites to enrol this course, it is strongly recommendable that students had already passed the annual subject of first course:

- Personality development

## Objectives and Contextualisation

This course is for students that had been passed all the basic training.

This course is about specific didactics in mathematics, and is done simultaneously with other specific didactics courses. The main themes of the course are the knowledge of the mathematics curriculum in early childhood education, the main specific mathematical contents: logics and numbers, with special emphasis on the zero to three year old period.

The 4th year subject "Mathematical Practice in the Early Childhood Education Classrooms" has to be understood as the natural continuation of this course. Once all compulsory subjects of didactics in mathematics are passed, one has the possibility to enrol, in the very last semester of the degree, the subject entitled "Mathematical Games and Activities in Early Childhood Education".

Objectives of the course:

- 1.- To be familiar with the main topics of the curriculum in early age education in the period from zero to six years old, with special emphasis in mathematics.
- 2.- To be familiar with the mathematical contents of the curriculum in the periods from zero to three and from three to six years old: logics and numbers.
- 3.- To be familiar with the ways to engage mathematical activities from zero to six year old.
- 4.- To design situations of mathematical learning in the period from zero to three year old.

## Competences

- Consider classroom practical work to innovate and improve teaching.
- Demonstrate knowledge and understanding of the aims, curricular contents and criteria of evaluation of Infant Education
- Promote and facilitate early infant learning, from a global and integrative perspective of different cognitive, emotional, psychomotor and developmental dimensions.
- Promoting experiences of initiation into information and communication technologies.
- Properly express oneself orally and in writing and master the use of different expression techniques.
- Understand teaching strategies to develop numerical representations and spatial geometric and logical development notions,.
- Understand the scientific, mathematical and technological bases of the curriculum at this stage as well as theories on the acquisition and development of the corresponding learning.

## Learning Outcomes

1. Be able to communicate in writing by making a personal draft, having documented and referenced the texts consulted.
2. Be able to find and evaluate the relevance and adequacy of technologies for learning and knowledge for teaching and learning mathematics in kindergarten and nursery school.
3. Be able to locate and select mathematical content and learning objectives in the curriculum.
4. Be able to orally communicate synthesis of the most relevant aspects of a job using various technologies for learning and knowledge and in the required time.
5. Be able to select appropriate materials and situations for the nursery to promote learning and autonomy while respecting the uniqueness of each child.
6. Have the capacity to organize both personal and group work to perform the tasks required of the subject.
7. Know about professional support, physical and web-based resources.
8. Know of the structure, content, organization and utility of curricula of reference.
9. Understand the diversity of materials and situations suitable for the development of mathematical thinking in kindergartens.
10. Understand the mathematical and didactic foundations of the curriculum for this stage regarding geometry and measurement.
11. Understand the mathematical and didactic foundations of the curriculum for this stage regarding logic and numbers.
12. Understand theories on the development of mathematical thinking in early childhood.

## Content

This subject have 4 main content blocks:

### 1.- Curriculum and mathematical contents in early age education

1.1. Official regulations (DECRET 101/2010, de 3 d'agost; DECRET 282/2006, de 4 de juliol; DECRET 181/2008, de 9 de setembre; ORDRE EDU/484/2009, de 2 de novembre).

1.2. Curriculum and the role of mathematics in it.

1.3. Psychological theoretical framework of teaching and learning mathematics. Constructivist approach.

### 2.- The development of mathematical Logic reasoning in early ages

2.1. How is mathematical logic reasoning developed in early ages, 0-3 i 3-6.

2.2. Materials for the development of logic thinking in early ages 0-3: Specific and unspecific materials.

2.3. Situations - transition from the first to the second year: treasure basket and heuristic game.

2.4. Situations - from the second to the third year: experimentation tray, daily life situations, eating time, etc.

3.- The development of mathematical thinking from 3-6 year old and its continuity

3.1. Organization of the mathematical contents in four fundamental parts.

3.2. Logics: attributes and collectables. Relationships and change. Pattern searching.

4.- Numbers and operations

4.1. Numbers and operations. Quantifiers. Construction of the number. To read and write numbers down. Actions on the quantity: to add, to subtract, to group, to split, to repeat, etc.

4.2. The decimal numeric system. Mental calculus.

## Methodology

Activity	Time needed	Methodology
Classroom activity Whole group	10	Lectures of the basic themes of the subject. It done with the whole session will usually finish with a brief explanation of the tasks to be
Seminars Reduced groups	20	Workspaces in reduced groups (50% of the whole group) with the deepen in the concepts and themes they have dealt with in the whole
Monitoring seminars Reduced groups	20	Workspaces in smaller groups where students present their work
Personal work	50	Students have to look for references on their own to deepen in the professor. Moreover, they have to finish all the activities proposed

## Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Classroom activity, whole group and seminars	30	1.2	6, 3, 2, 4, 1, 5, 9, 8, 12, 7, 10, 11
Type: Supervised			
Individual or small group work	20	0.8	
Type: Autonomous			
Personal work	50	2	1, 8, 12, 7

## Assessment

The evaluation of the progress of each student will be done along the whole semester by the activities in the next table.

It is mandatory to attend to all the classes to be evaluated. But at most 20% of the total can be missed due to justified incidents. In any other case, the final mark will be 'not presented'. This will also be the case if any of the mandatory activities are not delivered on time. One can only be graded if at least a mark of 5 has been obtained in each of the activities listed below.

In case the students have not obtained the minimal mark to pass (5 points) there is the option to do a single individual exam to reevaluate at the end of the course (14-01-2020 to students of group 62 and 16-01-2020 to students of group 61) if they fulfill ALL the following conditions: they have attended to all the sessions (at most 20% of the total can be missed due to justified incidents), they delivered all the activities on time and the activities that didn't have the mark to pass (5 points) have obtained 3,5 points at least.

Assesment Activities	% mark	Time	What and when?	
Written test	50%	2 classroom activity + personal work	Questions related to competency achivement of the subject.  At the end of all teaching units.  17-12-2019 (group 62) / 19-12-2019 (group 61)	• • •
Group work	20%	4 classroom activity + personal work	The main topic will be the period from zero to three years old. Each group will deliver an essay and will do a presentation in the monitoring seminars.  About the middle of period of the subject	
Work in seminars, both individually and ingroups	30% (20% individual + 10% en grup)	20 classroom activity + personal work	The work in seminars will be focused in the main parts of the mathematical contents of the subject. Each group will deliver a unique document that contains all the work done in the seminars with a individual final essay.  Continous assessment during the development of the seminars and sumative evaluation at the end of all teaching units.	

## Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Final Exam (individual)	50%	0	0	1, 8, 10, 11
Group work	20%	0	0	6, 3, 2, 4, 1, 5, 9, 12, 7
Work in seminars (20% individually and 10% groups)	30%	0	0	6, 2, 4, 1, 12

## Bibliography

- Alsina, A. (2004). *Com desenvolupar el pensament matemàtic dels 0 als 6 anys*. Vic: Eumo.
- Berdoneau, C. (2007). *Matemáticas activas (2-6 años)*. Barcelona: Graó.
- Brunton, P., & Thornton, L. (2006). *The little book of treasure boxes*. London: Featherstone Education.
- Canals, M. A. (2009). *Primers nombres i primeres operacions*. Associació de Mestres Rosa Sensat. Els dossiers de la Maria Antònia Canals, 101. Barcelona: Rosa Sensat.
- Canals, M. A. (2009). *Lògica a totes les edats*. Associació de Mestres Rosa Sensat. Els dossiers de la Maria Antònia Canals, 104. Barcelona: Rosa Sensat.
- Carbó, L., & Gràcia, V. (2005). *Els continguts matemàtics en el currículum d'infantil*. En: *Mirant el món a través dels números*. (pp. 55-68). Lleida: Pagès Editors.
- Chamorro, M.C. (2006). *Didáctica de las Matemáticas para Educación Infantil*. Madrid: Pearson Education.
- Decret 181/2008, de 9 de setembre, pel qual s'estableix l'ordenació dels ensenyaments del segon cicle d'educació infantil. *Diari oficial de la Generalitat de Catalunya*, Departament d'Educació, 16 de setembre de 2008, número 5216, pp. 68256 - 68273.
- Departament d'Ensenyament (2012). Currículum i orientacions d'Educació Infantil Primer Cicle. Disponible a: <http://xtec.gencat.cat/web/.content/alfresco/d/d/workspace/SpacesStore/0080/bfd2cd16-10d5-4103-aba2-ee9744>
- Departament d'Ensenyament (2015). Orientacions per a l'avaluació d'Educació Infantil Primer Cicle. Disponible a: <http://ensenyament.gencat.cat/web/.content/home/departament/publicacions/colleccions/curriculum/orientacions>
- Departament d'Ensenyament (2016). Currículum i orientacions d'Educació Infantil Segon Cicle. Disponible a: <http://ensenyament.gencat.cat/web/.content/home/departament/publicacions/colleccions/curriculum/curriculum-in>
- Edo, M. (1991). El càlcul mental a Parvulari, *Guix Elements d'acció educativa*, 169, 11-16.
- Edo, M. (2012). Aquí empieza todo. Las matemáticas de cero a tres años. *Números. Revista de Didáctica de las Matemáticas*, 80, 71-84.
- Equip de l'Escola Bressol Nenes i Nens (2001). La lògica matemàtica en el periodo 0-6 años. *Educación Infantil. Orientaciones y Recursos (0-6 años)*. (pp. 1-58). Barcelona: Praxis.
- Equip de l'Escola Bressol Nenes i Nens (2002). La lògica matemàtica a l'escola bressol. *Temes d'infància*, 26. Barcelona: Rosa Sensat.
- Gutiérrez, E. H. (2013). El aprendizaje del número natural en un contexto ordinal en la Educación Infantil. *Edma 0-6: Educación Matemática en la Infancia*, 2(1), 41-56.
- Kamii, C. (1982). Introducción. Dins: *El número en la educación preescolar* (pp. 9-27). Madrid: Visor.
- Vila, B., & Cardó, C. (2005). *Material sensorial (0-3 años). Manipulación y experimentación*. Barcelona: Graó, 2005.
- Zúñiga, M. (2014). El aprendizaje de la descomposición aditiva en la Educación Infantil: Una propuesta para niños y niñas de 5 a 6 años. *Edma 0-6: Educación Matemática en la Infancia*, 3(2), 84-113.