

COURSE DESCRIPTION

COURSE DETAILS

Title (of the course): **DESARROLLO DEL PENSAMIENTO MATEMÁTICO**

Code: 100757

Degree/Master: **GRADO DE EDUCACIÓN INFANTIL**

Year: 1

Name of the module to which it belongs: APRENDIZAJE DE LAS CIENCIAS DE LA NATURALEZA, DE LAS CIENCIAS SOCIALES

Field: DESARROLLO DEL PENSAMIENTO MATEMÁTICO

Character: OBLIGATORIA

Duration: FIRST TERM

ECTS Credits: 6.0

Classroom hours: 60

Face-to-face classroom percentage: 40.0%

Study hours: 90

Online platform: <http://moodle.uco.es/>

LECTURER INFORMATION

Name: JIMÉNEZ FANJUL, NOELIA NOEMI (Coordinator)

Department: MATEMÁTICAS

Area: DIDÁCTICA DE LA MATEMÁTICA

Office location: Planta alta, módulo A, Facultad Ciencias de la Educación y Psicología

E-Mail: noelia.jimenez@uco.es

Phone: 957218942

PREREQUISITES AND RECOMMENDATIONS

Prerequisites established in the study plan

There are no previous requisites.

Recommendations

It is strongly recommended to attend classes and actively participate in.

It is advisable that students have at least a B-1 level in English (no certification required).

INTENDED LEARNING OUTCOMES

- | | |
|-------|---|
| CB1 | Students have demonstrated knowledge and understanding in a field of study that builds upon their general secondary education, and is typically at a level that, whilst supported by advanced textbooks, includes some aspects that will be informed by knowledge of the forefront of their field of study. |
| CB2 | Students can apply their knowledge and understanding in a manner that indicates a professional approach to their work or vocation, and have competences typically demonstrated through devising and sustaining arguments and solving problems within their field of study. |
| CB4 | Students can communicate information, ideas, problems and solutions to specialist and non-specialist audiences. |
| CE1 | Knowledge of the objectives, curriculum content and assessment criteria in early childhood education. |
| CE11 | Reflect on classroom practices to innovate and improve teaching. Acquire habits and skills for independent and cooperative learning and promote them in students. |
| CM8.1 | Knowledge of the scientific, mathematical and technological foundations of the curriculum at this stage as well as theories on the acquisition and development of the relevant subject areas. |
| CM8.2 | Knowledge of teaching strategies for developing numerical representations and spatial, geometric and logical notions. |
| CM8.3 | Understand mathematics as sociocultural knowledge. |



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OBJECTIVES

1. To realize of the importance of mathematical learning as an essential part for the overall people development.
2. To know the mathematical concepts that integrate the early childhood curriculum.
3. To learn the theoretical foundations of the elementary mathematics.
4. To develop professional skills that allow a close connection between mathematical knowledge and its didactic.
5. To understand and manipulate specific mathematical teaching materials in early childhood education.

CONTENT

1. Theory contents

The course is divided into five chapters or sections according to its main topics. The first one is devoted to the foundational aspects of mathematics teaching and the remaining ones are devoted to the main mathematical topics and their didactic.

Chapter 1: Foundations in early childhood mathematics education.

- 1.1. Mathematics in early years. Curricular suggestions.
- 1.2. Learning theories related to mathematics education in early years.
- 1.3. Learning theories implication in early childhood education. Building up mathematical concepts. Connections.

Chapter 2: Development of children's logical mathematical reasoning.

- 2.1. Evolution of the children's logical mathematical reasoning.
- 2.2. Classifications and their contribution to build up the mathematical concepts.
- 2.3. Patterns and sequences as tools for building up mathematical knowledge.
- 2.4. Manipulatives and resources for developing logical reasoning.

Chapter 3: Number in early childhood education.

- 3.1. Natural numbers and numerical contexts.
- 3.2. Stages in the natural number acquisition. From mastering the oral number sequence to effective counting.
- 3.3. Cardinal and Ordinal numbers.
- 3.4. Addition and subtraction of natural numbers in problem solving. Problem solving strategies.
- 3.5. Manipulatives and resources for developing number sense.

Chapter 4: Magnitudes and measures in early childhood education.

- 4.1. Notion of magnitude, quantity and measure.
- 4.2. Stages in building up magnitudes and their measurements.
- 4.3. School magnitudes.
- 4.4. Manipulatives and resources for the learning of measures.

Chapter 5: Development of children geometric thinking.

- 5.1. Spatio-temporal orientation and logical development.
- 5.2. Development of children's temporal notions.
- 5.3. Development of children's geometrical notions.
- 5.4. Manipulatives and resources for developing children's geometric thinking.

2. Practical contents

1. Manipulatives resources used for teaching mathematics in early years.
2. Planning a teaching class and didactic intervention with kindergarteners (project).

SUSTAINABLE DEVELOPMENT GOALS RELATED TO THE CONTENT

Quality education



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METHODOLOGY

General clarifications on the methodology (optional)

The English medium instruction (EMI) will be used to enable a "natural" environment for content learning through a second language (L2).

All the materials will be provided in English, including exams, and other assessment instruments. The delivery of content, whole-class interaction, the learning materials, and the demonstration and assessment of learning outcomes (such as oral presentations, assignments, or tests) should be in English.

Spanish may be only used in a limited way -to clarify and reach the objectives- in specific circumstances, for example, Student-to-student and teacher-to-student interaction during pair work and group work.

Students will be asked to actively participate in class (and virtual forum) and group-work-based learning will be mainly used.

Methodological adaptations for part-time students and students with disabilities and special educational needs

Part-time students must put in contact with the teacher so as to reach an agreement about the specific development of the subject and the due dates of the activities to be carried out.

The methodological strategies and the assessment set in this syllabus will be adapted for (documented) special needs students when appropriate. Students under these specifications must contact the teacher at the beginning of the course.

Face-to-face activities

Activity	Large group	Medium group	Total
<i>Assessment activities</i>	4	-	4
<i>Group work (cooperative)</i>	3	11	14
<i>Lectures</i>	28	-	28
<i>Projects</i>	4	4	8
<i>Text analysis</i>	4	-	4
<i>Tutorials</i>	2	-	2
Total hours:	45	15	60

Off-site activities

Activity	Total
<i>Activities</i>	10

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Activity	Total
<i>Exercises</i>	20
<i>Group work</i>	10
<i>Information search</i>	10
<i>Reference search</i>	10
<i>Self-study</i>	30
Total hours	90

WORK MATERIALS FOR STUDENTS

Dossier
Exercises and activities
Oral presentations
Placement booklet
References

Clarifications

Materials will be provided through moodle.

EVALUATION

Intended learning	Exams	Practice Book	Project
<i>CB1</i>		X	
<i>CB2</i>	X		X
<i>CB4</i>			X
<i>CE1</i>	X		X
<i>CE11</i>	X	X	X
<i>CM8.1</i>	X	X	
<i>CM8.2</i>	X	X	X
<i>CM8.3</i>	X	X	
Total (100%)	60%	20%	20%
Minimum grade	5	5	5

(*)Minimum mark (out of 10) needed for the assessment tool to be weighted in the course final mark. In any case, final mark must be 5,0 or higher to pass the course.

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Attendance will be assessed?:

No

General clarifications on instruments for evaluation:

Class attendance is mandatory, given the face-to-face nature of the subject, and it is a requirement to pass the subject.

Any foreseen absence must be communicated previously and, in any case, it must be documented afterward. Only medical justifications or force majeure will be considered.

The practices (column "Practice book") and project (column "Project") are of compulsory attendance for all the students. Only students with a documented absence could make up practices.

The minimum grade for every of the three assessment instruments specified in the table above is needed in order to aggregate them for obtaining the final subject grade. The minimum grade for passing the subject is 5.

Students with practices and/or project below the minimum grade specified will attend a final examination covering all the pending content, goals, and competencies of the subject matter.

Partial qualifications (Exams; Practices; Project) will be kept until the end of the current academic period as long as the minimum grade was obtained.

Note1: In order to pass the subject course, a good level of linguistic and communicative competence (in Spanish) will be essential. The lack of correction in the preparation of oral or written texts (in Spanish) may negatively impact the final grade and even implies the subject's failure. Nevertheless, English will be encouraged and used throughout the course and as a communication vehicle. English errors (grammar, punctuation, spelling) could be pointed out but, in no way, they will decrease the final grade. Mistakes in Spanish will decrease the final grade as stated above.

Note2: An attitude of respect between men and women will be taken into account, both in the written and oral texts and in the behavior with classmates. The training in equality matters is a fundamental issue for a prospective teacher, in order to develop in students the ability to filter and select appropriate materials and resources, encourage their critical sense and respect, etc.

Clarifications on the methodology for part-time students and students with disabilities and special educational needs:

Part-time students and students with documented special needs will be provided with specific learning conditions. They must contact the professor prior to the beginning of the course. The methodological strategies and the assessment method set in this syllabus will be adapted for (documented) special needs students when appropriate.

Nevertheless, they must pass every assessment instrument.

Clarifications on the evaluation of the extraordinary call and extra-ordinary call for completion studies:

For extraordinary calls, students will be examined for the entire course, not keeping the passed partial grades from the different evaluation items of previous courses.

Qualifying criteria for obtaining honors:

At the discretion of the teaching staff, as long as the requirements set in the UCO Regulation are met.

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BIBLIOGRAPHY

1. Basic Bibliography

- Aguilar, B. Ciudad, A., Láinez, MC. Y Tobaruela, A. (2010). *Construir, jugar y compartir. Un enfoque constructivista de las matemáticas en educación infantil*. Enfoques Educativos, S.L.
- Canals, M.A. (2009). *Primeros números y primeras operaciones*. (Colección "Los dossiers de Maria Antònia Canals", 101). Associació de Mestres Rosa Sensat.
- Canals, M.A. (2011). *Las regletas*. (Colección "Los dossiers de Maria Antònia Canals", 104). Associació de Mestres Rosa Sensat.
- Canals, M.A. (2009). *Superficies, volúmenes y líneas*. (Colección "Los dossiers de Maria Antònia Canals", 105). Associació de Mestres Rosa Sensat.
- Canals, M.A. (2009). *Transformaciones Geométricas*. (Colección "Los dossiers de Maria Antònia Canals", 106). Associació de Mestres Rosa Sensat.
- Castro-Martínez, E. y Castro-Martínez, E. (Eds.). (2016). *Enseñanza y aprendizaje de las matemáticas en Educación Infantil*. Pirámide.
- Clements, D. H., & Sarama, J. (2009). *Learning and Teaching Early Math. The Learning Trajectories Approach* (1st ed.). Routledge.
- Coriat, M. (2009). *Educación matemática infantil*. Universidad de Granada.
- DCSF. (2009). *Children thinking mathematically: PSRN essential knowledge for Early Years practitioners*. The Department for Children, Schools and Families.
- García Pérez, M. T., y Adamuz-Povedano, N. (Eds.). (2019). *Del número al sentido numérico y de las cuentas al cálculo táctico. Fundamentos, recursos y actividades para iniciar el aprendizaje*. Octaedro.
- Haylock, D. & Cockburn, A. (2013). *Understanding Mathematics for Young Children*. Sage Publications Ltd.
- Jiménez-Fanjul, N. N. (2019). Uso de los materiales manipulativos en los primeros años del aprendizaje matemático. En M. T. García Pérez y N. Adamuz-Povedano (Eds.), *Del número al sentido numérico y de las cuentas al cálculo táctico. Fundamentos, recursos y actividades para iniciar el aprendizaje* (pp. 57-74). Octaedro.
- Ministry of Education Republic of Singapore. (2013). *Nurturing Early Learners. A Curriculum for Kindergartens in Singapore. Numeracy*. Ministry of Education Republic of Singapore.
- Resnick, L. B. y Ford, W. W. (1990). *La enseñanza de las matemáticas y sus fundamentos psicológicos*. Paidós- MEC.

2. Further reading

- Alsina, A. (2014). Procesos matemáticos en Educación Infantil: 50 ideas clave. *Revista de Didáctica de las Matemáticas*; Números, 86, 5-28.
- Canals, M.A. (1981). La matemática en el parvulario. *Nuestra Cultura*.
- Crovetti, G. (1986). *Educación lógico-matemática*. Cincel.
- Cross, C. T., Woods, T. A., & Schweingruber, H. (2009). *Mathematics Learning in Early Childhood: Paths Toward Excellence and Equity*. Washinton, DC: The National Academies Press. http://www.nap.edu/download.php?record_id=12519
- Donovan, S. M., & Bransford, J. D. (2005). *How Students Learn: Mathematics in the Classroom*. The National Academy Press. http://www.nap.edu/download.php?record_id=11101
- Hughes, M. (1987). *Los niños y los números. Las dificultades en el aprendizaje de las matemáticas*. Planeta.
- Martínez Montero, J. y Sánchez Cortés, C. (2012). *Desarrollo y mejora de la inteligencia matemática en Educación Infantil*. Wolters Kluwer
- Maz-Machado, A., Jiménez-Fanjul, N., & Madrid, M. J. (2015). La casita matemática: una experiencia para aprender a enseñar matemáticas en Educación Infantil. Paper presented at the 17 JAEM, Cartagena, España.
- Mira, M. R. (1989). *Matemática viva en el parvulario*. CEAC.
- National Council of Teacher of Mathematics [NCTM]. (2003). *Principios y Estándares para la Educación*

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Matemática (M. Fernández, Trad.). Sociedad Andaluza de Educación Matemática THALES -NCTM.
 Piaget, J.(1976). Génesis de las estructuras lógicas elementales. Clasificaciones y seriaciones. Guadalupe.
 Rodríguez, M. M. (2013). Cuentos para aprender y enseñar matemáticas: en educación infantil. Narcea Ediciones.
 Ruesga, M. P. (2004). Las matemáticas a través del juego. Aplicaciones prácticas para el aula de infantil.
 Universidad de Burgos.
 Ruesga, M. P. (2004). El inicio del razonamiento en la infancia. Universidad de Burgos.

COORDINATION CRITERIA

Common evaluation criteria
 Tasks deadlines

Clarifications

Common evaluation criteria.
 Tasks deadlines.

SCHEDULE

Period	Assessment activities	Group work (cooperative)	Lectures	Projects	Text analysis	Tutorials
1# Fortnight	0,0	2,0	4,0	0,0	0,0	0,0
2# Fortnight	0,0	2,0	4,0	0,0	1,0	0,0
3# Fortnight	0,0	2,0	4,0	0,0	1,0	0,0
4# Fortnight	0,0	2,0	4,0	3,0	0,0	0,0
5# Fortnight	0,0	2,0	4,0	0,0	2,0	0,0
6# Fortnight	0,0	2,0	4,0	0,0	0,0	1,0
7# Fortnight	4,0	2,0	4,0	5,0	0,0	1,0
Total hours:	4,0	14,0	28,0	8,0	4,0	2,0

The methodological strategies and the evaluation system contemplated in this Course Description will be adapted according to the needs presented by students with disabilities and special educational needs in the cases that are required.