

## SUBJECT TEACHING GUIDE

G1746 - Development and Teaching of Mathematical Reasoning

Degree in Early Childhood Education

Academic year 2019-2020

1. IDENTIFYING DATA			
Degree	Degree in Early Childhood Education	Type and Year	Compulsory. Year 2
Faculty	School of Teacher Training		
Discipline	Subject Area: Learning of Natural Sciences, Social Sciences and Mathematics Module: Training in Teaching and the Discipline		
Course unit title and code	G1746 - Development and Teaching of Mathematical Reasoning		
Number of ECTS credits allocated	6	Term	Semester based (2)
Web			
Language of instruction	English	Mode of delivery	Face-to-face

Department	DPTO. MATEMATICAS, ESTADISTICA Y COMPUTACION		
Name of lecturer	JOSE MANUEL DIEGO MANTECON		
E-mail	josemanuel.diego@unican.es		
Office	Facultad de Ciencias. Planta: + 0. DESPACHO DE PROFESORES (0060)		
Other lecturers			

### 3.1 LEARNING OUTCOMES

- To know the genesis and development of mathematical concepts in young children
- To be able to elaborate mathematical activities for preschool education
- To be able to connect and develop specific mathematical content in preschool education

#### 4. OBJECTIVES

- To master the mathematical content of the preschool education curriculum
- To foster students' reflection about their knowledge on mathematics in learning and teaching contexts .
- To gain an initial preparation in the development of mathematical activities for preschool education
- To know the genesis and development of mathematical concepts , especially those that appear in the preschool education curriculum

#### 6. COURSE ORGANIZATION

CONTENTS	
1	Mathematical logic: child acquisition of logical–mathematical Knowledge, games and didactic materials.
2	Evolution of the number since the first quantifications to the process of counting: numerical contexts, child acquisition of number concept.
3	Numeral systems. Base, place value and rules in different numeral systems.
4	Arithmetic operations: didactic materials and resources.
5	Geometry in preschool education: concepts and properties.
6	Geometrical elements: point, line and plane. Plane and space shapes.
7	Quantity and measurement in preschool education
8	Spontaneous measurement and measurement units in young children
9	Quantity and measurement in the early childhood education curriculum. Teaching proposals.

## 7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Midterm Exam (First part of the content)	Written exam	No	Yes	50,00
Final Exam	Written exam	Yes	Yes	50,00
TOTAL				100,00
<b>Observations</b>				
<p>First enrollment students: The final exam will include part 1 and part 2 of the content. Each part will be independently qualified. The students obtaining 4 points or more (out of 10) in the exam of part 1 (undertaken in the middle of term) will not have to necessary examine of the part 1 content in the final exam.</p> <p>Students not passing the subject in the regular period (June) will be able to take a new exam in the extraordinary period (September). This exam will include all the subject content.</p> <p>Students with second enrollment or more: Students who do not enroll for the first time in the subject have the same consideration as students registered part-time (see the corresponding observations).</p> <p>Other aspects to take into account: - SPELLING: the correct spelling and grammar in the assessments are requirements for passing the course. - PLAGIARISM: The point 54.1 of the Regulation of the evaluation processes at the University of Cantabria is recalled— 'The fraudulent conduct in tests and evaluation activities will directly imply the mark fail (0) in the subject'. CITATION RULES: Finally, the School Board approved that the Faculty assumes the APA RULES for all academic work as citation criteria . Although these standards have different editions , as an initial reference we attach the BUC link, hoping that this will be helpful and a reference for its development: <a href="http://web.unican.es/buc/recursos/guias-y-tutoriales/guia ? g = 28">http://web.unican.es/buc/recursos/guias-y-tutoriales/guia ? g = 28</a></p>				
<b>Observations for part-time students</b>				
The final mark for part time students will be obtained from a single exam (100% of the evaluation).				

## 8. BIBLIOGRAPHY AND TEACHING MATERIALS

### BASIC

- Alsina (2011). Educación matemática en contexto: de 3 a 6 años. Cuadernos de educación nº 62. Barcelona: Horsori.
- Alsina, A. (2006). Cómo desarrollar el pensamiento matemático de 0 a 6 años: Propuestas didácticas. Octaedro-Eumo.
- Alsina, C. y otros. (1987). Invitación a la didáctica de la Geometría. Madrid: Síntesis.
- Alsina, C.; Burgués, C.; Fortuny, J. M.; Jiménez, J. y Torra, M. (1996). Enseñar matemáticas. Graó, Barcelona.
- Bravo, J. A. F. (2015). Desarrollo del pensamiento lógico y matemático: el concepto de número y otros conceptos. Grupo Mayeutica Conpa
- Burgues, C. y otros (1988). Materiales para construir la Geometría. Madrid: Síntesis.
- Canals, A. (1980). La matemática en el parvulario. Madrid: Síntesis.
- Castro, E., & Martínez, E. C. (Eds.). (2016). Enseñanza y aprendizaje de las matemáticas en educación infantil. Pirámide.
- Castro, E. y otros (1987). Números y operaciones. Madrid: Síntesis.
- Chamorro, M. D. C., & Belmonte, J. (2005). Didáctica de las matemáticas para educación infantil. Alhambra.
- Chamorro, C. y otros (1988). El problema de la medida. Didáctica de las magnitudes lineales. Madrid: Síntesis.
- Chamorro, C., & Belmonte, J. M. (1988). El problema de la medida. Didáctica de las magnitudes lineales. Madrid: Editorial Síntesis.
- Cid, E., Godino, J. D., Batanero, C. (2003). Sistemas numéricos y su didáctica para maestros. Universidad de Granada. (<http://www.ugr.es/local/jgodino/edumat-maestros/>)
- Clements, D. H. & Stephan, M. (2004). Measurement in Pre-K to Grade 2 Mathematics. In D. H. Clements, J. Sarama, & A.-M. DiBiase (Eds.), Engaging young children in Mathematics: Standards for early childhood mathematics education pp. 299-317. Mahwah, NJ: Lawrence Erlbaum.
- Clements, D. H., Battista, M., & Sarama, J. (1998). Development of geometric and measurement ideas. In R. Lehrer and D. Chazan (Eds.), Designing learning environments for developing understanding of geometry and space (pp. 201-225). Mahwah, NJ: Lawrence Erlbaum Associates.
- Dienes, Z. (1976). Los primeros pasos en matemáticas. Lógica y juegos lógicos. Barcelona: Teide.
- Douglas, D. H.; Clements, J. & Sarama, J. (2009). Learning and Teaching Early Maths. The learning Trajectories Approach. New York: Routledge.
- Holloway, G. (1982). Concepción del espacio en el niño según Piaget. Barcelona: Paidós.
- Kamii, C. (1984). El número en la educación preescolar. Madrid: Visor.
- Kamii, C. (1986). El niño reinventa la Aritmética. Madrid: Visor.
- Kothe, S. (1978). Cómo utilizar los Bloques Lógicos de Z.P. Dienes. Barcelona: Teide.
- Lehrer, R., Jenkins, M, & Osana, H. (1998). Longitudinal study of children's reasoning about space and geometry. In R. Lehrer & D. Chazan (Eds.), Designing learning environments for developing understanding of geometry and space (pp. 137-167). Mahwah, NJ: Lawrence Erlbaum Associates.
- Lovell, K. (1984). Desarrollo de los conceptos básicos matemáticos y científicos en los niños. Madrid: Morata, S.A.
- Martínez, A, y otros (1989). Una metodología activa y lúdica para la enseñanza de la Geometría. Madrid: Síntesis.
- Maza, C. (1991). Enseñanza de la suma y de la resta. Madrid: Síntesis.
- Olmo, A. y otros (1989). Superficie y volumen. Madrid: Síntesis.
- Puig, L. Y Cerdan, F. (1988). Problemas aritméticos escolares. Madrid: Síntesis.
- Sanz, I. y otros (1988). Por los caminos de la Lógica. Madrid: Síntesis.
- SAUVY, J. (1980). El niño ante el espacio. Madrid: Pablo del Río.
- Skemp, R. (1980). Psicología del aprendizaje de las matemáticas. Madrid: Síntesis.
- Van de Heuvel-Panhuizen, M., & Buys, K. (2005). Young Children Learn Measurement and Geometry. A learning-teaching trajectory with intermediate attainment targets for the lower grades in primary school. Freudenthal Institute, Utrecht University.
- Yáñez, J. C., Catalán, M. D. L. C. M., Pastells, ... & Muñoz, Y. M. V. (2018). Didáctica de las matemáticas para maestros de Educación Infantil. Ediciones Paraninfo, SA.