Information about the subject

Degree: Bachelor of Arts Degree in Primary School Education

Faculty: Faculty of Teacher Training and Education Sciences

Code: 1160302 **Name:** Teaching of Mathematics

Credits: 6,00 **ECTS Year:** 3 **Semester:** 2

Module: Teaching and learning of Mathematics

Subject Matter: Mathematics and its Didactics **Type:** Compulsory

Field of knowledge: Social and Legal Science

Department: Mathematics, Natural Sciences, and Social Sciences applied to Education

Type of learning: Classroom-based learning / Online

Languages in which it is taught: English, Spanish

Lecturer/-s:

1163A	Sonia Martin Carbonell **(Responsible Lecturer)**	sonia.martin@ucv.es
1163B	Ana Isabel Carceles Medina **(Responsible Lecturer)**	anaisabel.carceles@ucv.es
1163G	Elena Moreno Gálvez **(Responsible Lecturer)**	elena.moreno@ucv.es
116A3Z	Aida Garcia Sanz **(Responsible Lecturer)**	aida.garcia@ucv.es
116D122	Aida Garcia Sanz **(Responsible Lecturer)**	aida.garcia@ucv.es
116OL3	Maria Dolores Tortosa Jorques **(Responsible Lecturer)**	md.tortosa@ucv.es
1174PR	Maria Dolores Tortosa Jorques **(Responsible Lecturer)**	md.tortosa@ucv.es

144CD	Ana Isabel Carceles Medina **(Responsible Lecturer)**	anaisabel.carceles@ucv.es
144DALA	Aida Garcia Sanz **(Responsible Lecturer)**	aida.garcia@ucv.es
144DP	Sonia Martin Carbonell **(Responsible Lecturer)**	sonia.martin@ucv.es
144DPA	Carlos Ferreira Gauchia **(Responsible Lecturer)**	carlos.ferreira@ucv.es
CAGD	Ana Isabel Carceles Medina **(Responsible Lecturer)**	anaisabel.carceles@ucv.es
CAGDPIMI	Ana Isabel Carceles Medina **(Responsible Lecturer)**	anaisabel.carceles@ucv.es
PR1AFD	Aida Garcia Sanz **(Responsible Lecturer)**	aida.garcia@ucv.es

Module organization

Teaching and learning of Mathematics

Subject Matter	ECTS	Subject	ECTS	Year/semester
Mathematics and its Didactics	15,00	Fundamentals of Arithmetic and Measurement	4,50	1/2
		Fundamentals of Geometry and Information Processing	4,50	3/1
		Teaching of Mathematics	6,00	3/2

Learning outcomes

At the end of the course, the student must be able to prove that he/she has acquired the following learning outcomes:

R1 The student actively participates in the proposed tasks in class.

R2 The student uses correct terminology and symbols specific to mathematics.

R3 The student maintains a high degree of grammatical and spelling accuracy.

R4 The student values mathematics as a cultural fact.

R5 The student provides clear and detailed oral and written descriptions and presentations, developing concrete ideas and concluding with appropriate conclusions, while maintaining a high degree of grammatical and spelling accuracy.

R6 The student designs and proposes activities and resources to work on different mathematical contents suitable for different levels, considering their specific characteristics as well as the difficulties and errors that children may make.

Competencies

Depending on the learning outcomes, the competencies to which the subject contributes are (please score from 1 to 4, being 4 the highest score):

BASIC		Weighting			
		1	2	3	4
CB4	That students will be able to convey information, ideas, problems and solutions to both specialized and non-specialized audiences.			x	

GENERAL		Weighting			
		1	2	3	4
CG1	Understand the curricular areas of Primary Education, the interdisciplinary relationship between them, the evaluation criteria, and the body of didactic knowledge around the respective teaching and learning procedures.		x		
CG2	Design, plan, and evaluate teaching and learning processes, both individually and in collaboration with other teachers and professionals from the school.				x
CG6	Know the organization of primary education schools and the diversity of actions involved in their functioning. Perform tutoring and orientation with students and their families, addressing the singular educational needs of the students. Recognize that the exercise of the teaching function must go on improving and adapting to the scientific, pedagogical, and social changes throughout life.	x			
CG10	Reflect on classroom practices to innovate and improve teaching work. Acquire habits and skills for autonomous and coopoerative learning and promote it among students.				x
CG11	Know and apply information and communication technologies in the classrooms. Selectively discern audiovisual information that contributes to learning, civic education, and cultural enrichment.			x	

SPECIFIC		Weighting			
		1	2	3	4
CE36	Acquire basic mathematical competencies (numerical, calculation, geometric, spatial representations, estimation, measurement, organization, and interpretation of information, etc.).	x			
CE37	Know the school curriculum of mathematics.				x
CE38	Analyze, reason, and communicate mathematical proposals.				x
CE39	Pose and solve problems linked to daily life.				x
CE40	Value the relationship between mathematics and sciences as one of the pillars of scientific thinking.				x
CE51	Develop and evaluate curriculum content using appropriate didactic resources and promote the corresponding competencies in students.				x

Assessment system for the acquisition of competencies and grading system

In-class teaching

Assessed learning outcomes	Granted percentage	Assessment method
R1, R2, R3, R4, R5, R6	10,00%	Oral presentation of group and individual works: Self-assessment systems (oral, written, individual, in groups). Oral tests (individual, in groups, presentation of topics or works).
	0,00%	Monitoring of student work in non-face-to-face/distance sessions: Observation techniques, rubrics, checklists. Portfolios.
	0,00%	Active participation in theoretical-practical sessions, seminars, and tutorials: Attitude scale (to gather opinions, values, social and managerial skills, interaction behaviors).
R2, R3, R4, R5, R6	55,00%	Written tests: Objective tests with short and extended responses.
R1, R2, R3, R4, R5, R6	35,00%	Projects. Development and/or design works.

Observations

The exam will consist of:

·A part of between 20 and 40 closed-answer questions (true or false, multiple choice, complete, order) that will count for 60% of the exam grade. One correct answer will be deducted for every three incorrect ones.

·A part of between 2 and 4 theoretical-practical development questions that will count for 40% of the exam grade.

Projects and development work will consist of:

·Classroom practices and questionnaires: 20% of the grade course.

·Work on the design of activities and materials: 15% of the grade course.

Classroom practices are carried out in the classroom, no way will alternative tasks or dates be offered for students who do not attend.

Single assessment:

Exceptionally, those students who cannot undergo the continuous evaluation system, due to not attending at least 60% of classes may opt for this assessment system. In that case they will be evaluated as follows:

·Exam with the same format described above: 55% of the course grade. Learning Outcomes:

R2-R6
·Classroom practices and questionnaires: These will be assessed through an exam and will account for 20% of the course grade. Learning Outcomes: R2-R6
·Work on the design of activities and materials: 15% of the course grade. Learning Outcomes: R1-R6
·Oral presentation of individual or group work:10% of the grade. Learning Outcomes: R1-R6

Artificial Intelligence:
·Students may use AI for personal study of the subject.
·The use of AI is not permitted for evaluable assignments, unless required in a specific activity and required by the instructor.
If AI is used in any activity, the specific part of the activity, the AI ??tool used, and the purpose must be stated.

Further observations:
Passing the exam is an essential, but not sufficient, requirement for passing the course.
It is an essential requirement to pass the subject that the student does not make more than 3 serious misspellings in each written test (both assignments and practices as well as the theoretical-practical exam).
The marks of the different sections of one course will not be saved for another.
Assignments or practicals that are not submitted on time and in the correct format to the Platform will not be accepted.

Online teaching

Assessed learning outcomes	Granted percentage	Assessment method
R2, R3, R4, R5, R6	55,00%	Written tests: short-answer objective tests, developmental tests. Projects. Reports/Practical reports. Design work, development
R1, R2, R3, R4, R5, R6	10,00%	Exposición oral de trabajos grupales e individuales: sistemas de autoevaluación (oral, escrita, individual, en grupo). Pruebas orales (individual, en grupo, presentación de temas-trabajos)
	0,00%	Monitoring of student work in non-face-to-face/distance sessions: Observation techniques, rubrics, checklists. Portfolios.
	0,00%	Active participation in theoretical-practical sessions, seminars, and tutorials: Attitude scale (to gather opinions, values, social and managerial skills, interaction behaviors).

R1, R2, R3, R4, R5, R6	35,00%	Projects. Development and/or design works.

Observations

The exam will consist of:

·A part of between 20 and 40 closed-answer questions (true or false, multiple choice, complete, order) that will count for 60% of the exam grade. One correct answer will be deducted for every three incorrect ones.

·A part of between 2 and 4 theoretical-practical development questions that will count for 40% of the exam grade.

Projects and development work will consist of:

Classroom practices, questionnaires and work on the design of activities and materials.

Artificial Intelligence:

·Students may use AI for personal study of the subject.

·The use of AI is not permitted for evaluable assignments, unless required in a specific activity and required by the instructor.

If AI is used in any activity, the specific part of the activity, the AI ??tool used, and the purpose must be stated.

Further observations:

Passing the exam is an essential, but not sufficient, requirement for passing the course.
It is an essential requirement to pass the subject that the student does not make more than 3 serious misspellings in each written test (both assignments and practices as well as the theoretical-practical exam).
The marks of the different sections of one course will not be saved for another.
Assignments or practicals that are not submitted on time and in the correct format to the Platform will not be accepted.

CRITERIA FOR THE AWARDING OF HONOURS:

In accordance with the regulations governing the assessment and grading of subjects in force at UCV, the distinction of "Matrícula de Honor" (Honours with Distinction) may be awarded to students who have achieved a grade of 9.0 or higher. The number of "Matrículas de Honor" (Honours with Distinction) may not exceed five percent of the students enrolled in the group for the corresponding academic year, unless the number of enrolled students is fewer than 20, in which case a single "Matrícula de Honor" (Honours with 9 Distinction) may be awarded. Exceptionally, these distinctions may be assigned globally across different groups of the same subject. Nevertheless, the total number of distinctions awarded will be the same as if they were assigned by group, but they may be distributed among all students based on a common criterion, regardless of the group to which they belong. The criteria for awarding "Matrícula de Honor" (Honours with Distinction) will be determined according to the guidelines stipulated by the professor responsible for the course, as detailed in the "Observations" section of the evaluation system in the course guide.

Learning activities

The following methodologies will be used so that the students can achieve the learning outcomes of the subject:

M1 Participatory Master Class

M2 Case Study

M5 Seminar Work

M6 Problem-based Learning

M7 Cooperative/Collaborative Work

M9 Group and Individual Tutoring

M10 Individual Tutoring

M11 Participatory Master Class

M12 Case Study

M13 Seminar Work

M17 Problem-based Learning

M18 Cooperative/Collaborative Work

M19 Individual Tutoring

M20 Group and Individual Tutoring

IN-CLASS LEARNING

IN-CLASS LEARNING ACTIVITIES

	LEARNING OUTCOMES	HOURS	ECTS
Group Work Presentation M1, M7	R1, R2, R3, R4, R5, R6	16,50	0,66
Theoretical Class M1, M6, M7	R1, R2, R3	15,00	0,60
Practical Class M6, M7, M9, M10	R1, R2, R3, R4, R5, R6	21,00	0,84
Tutoring M9, M10	R1, R2, R3, R4	5,50	0,22
Evaluation M1, M6	R1, R2, R3, R4, R5, R6	2,00	0,08
TOTAL		**60,00**	**2,40**

LEARNING ACTIVITIES OF AUTONOMOUS WORK

	LEARNING OUTCOMES	HOURS	ECTS
Group work M7	R1, R2, R3, R4, R5, R6	22,20	0,89
Individual work M10	R2, R3, R4, R5, R6	67,80	2,71
TOTAL		**90,00**	**3,60**

ON-LINE LEARNING

SYNCHRONOUS LEARNING ACTIVITIES

	LEARNING OUTCOMES	HOURS	ECTS
Theoretical class (e-learning mode) M11	R1, R2, R3, R4, R5, R6	25,00	1,00
Practical class (e-learning mode) M12, M17, M18, M20	R1, R2, R3, R4, R5, R6	21,00	0,84
Individual tutoring (e-learning mode) M19	R2, R3, R4, R5, R6	3,00	0,12
Evaluation (e-learning mode) M12, M17	R2, R3, R4, R5, R6	4,00	0,16
TOTAL		**53,00**	**2,12**

ASYNCHRONOUS LEARNING ACTIVITIES

	LEARNING OUTCOMES	HOURS	ECTS
Individual work Activities (e-learning mode) M12, M17, M19	R1, R2, R3, R4, R5, R6	67,50	2,70
Group Work (e-learning mode) M12, M17	R1, R2, R3, R4, R5, R6	21,50	0,86
Asynchronous Tutoring (e-learning mode) M19	R1, R2, R3, R4, R5, R6	1,00	0,04
Theoretical-Practical Class (distance mode) M11	R1, R2, R3, R4, R5, R6	7,00	0,28
TOTAL		**97,00**	**3,88**

Description of the contents

Description of the necessary contents to acquire the learning outcomes.

Theoretical contents:

Content block	Contents
Introduction	·Mathematical learning and teaching theories ·Mathematical learning difficulties ·Schoolar curriculum of Mathematics for Elementary School. ·Classification of instructional materials and resources. ·Problem solving: What is a problem? Polya fases in problem solving. Difficulties in problem solving
Didactics of Arithmetics	·Didactic sequence example. ·Arithmetics learning difficulties. ·Instructional materials and resources: analysis and design. ·Arithmetic problems solving. ·Activities proposal.
Didactics of Geometry	·Didactic sequence example. ·Geometry learning difficulties. ·Instructional materials and resources: analysis and design. ·Geometric problems solving. ·Activities proposal.
Didactics of Measure	· Didactic sequence example · Measure learning difficulties · Instructional materials and resources: analysis and design · Measure problems solving · Activities proposal

Didactics of Statistics and Probability	·Didactic sequence example. ·Statistics and probability learning difficulties. ·Instructional materials and resources: analysis and design. ·Statistics and probability problems solving. ·Activities proposal.

Temporary organization of learning:

Block of content	Number of sessions	Hours
Introduction	5,00	10,00
Didactics of Arithmetics	9,00	18,00
Didactics of Geometry	6,00	12,00
Didactics of Measure	6,00	12,00
Didactics of Statistics and Probability	4,00	8,00

References

Alsina Catalá , C. (1996). Enseñar matemáticas. Graó.
Alsina i Pastells, A. (2004). Desarrollo de competencias matemáticas con recursos lúdicosmanipulativos. Para niños y niñas de 6 a 12 años. Narcea.
Callejo, MªL. (1994). Un club matemático para la diversidad. Narcea
Carrillo, J., Contreras, L.C., Climent, N, Montes, M.A., Escudero, D.I. y Flores, E. (2016). Didáctica de las Matemáticas para maestros de Educación Primaria. Paraninfo.
Cascallana, M. T. (1988). Iniciación a la matemática. Materiales y recursos didácticos. Ed. Aula XXI / Santillana.
Castro, E. (2001). Didáctica de la matemática en la Educación Primaria. Madrid: Síntesis.
Chamorro, M. C. (2003). Didáctica de las Matemáticas para Primaria. Prentice Hall.
Colección (1991). Matemáticas: Cultura y aprendizaje. Madrid: Síntesis.
De Guzmán, M. (2004). Para pensar mejor. Ediciones Pirámide (Grupo Anaya S.A.).
Fernández Bravo, J.A. (2010). La resolución de problemas matemáticos. Creatividad y razonamiento en la mente de los niños. Grupo Mayéutica-educación.
Flores, P. y Rico, L. (2015) Enseñanza y aprendizaje de las matemáticas en Educación Primaria. Pirámide.
Gateño, C. (1961). Introducción al método Cuisenaire Gateño de los números en color para la enseñanza de la aritmética. Libro del maestro. Cuisenaire de España
Godino, J. D. (2004) Matemáticas para maestros, Dpto. Didáctica de las Matemáticas, Univ. Granada.
Kamii, C. (2003). El niño reinventa la aritmética. Implicaciones de la teoría de Piaget. A. Machado.
Miranda Casas, A. (1988). Dificultades del aprendizaje de las matemáticas. Un enfoque evolutivo. Aljibe.
NCTM (2000). Principles and standards for school mathematics. Edición electrónica: http://standards.nctm.org.
Nortes Checa, A. (1993). Matemáticas y su didáctica. Tema-DM.
Vidal Raméntol, S. (2021) La matemática nos facilita la vida. Laertes