Information about the subject

Degree: Bachelor of Arts Degree in Early Childhood Education

Faculty: Faculty of Teacher Training and Education Sciences

Code: 1410401 **Name:** Natural Sciences and their Teaching

Credits: 4,50 **ECTS Year:** 4 **Semester:** 1

Module: Learning the natural sciences, social sciences and mathematics

Subject Matter: Learning of natural sciences **Type:** Compulsory

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

Type of learning: Classroom-based learning

Languages in which it is taught: Spanish

Lecturer/-s:

144A	Maria Inmaculada Hernando Mora **(Responsible Lecturer)**	mi.hernando@ucv.es
144ALA	Laura Padilla Bautista **(Responsible Lecturer)**	laura.padilla@ucv.es
CAGD	Ana Isabel Carceles Medina **(Responsible Lecturer)**	anaisabel.carceles@ucv.es
	Maria Inmaculada Hernando Mora	mi.hernando@ucv.es

Module organization

Learning the natural sciences, social sciences and mathematics

Subject Matter	ECTS	Subject	ECTS	Year/semester
Learning mathematics	6,00	Mathematics and its Teaching	6,00	3/1
Learning of natural sciences	4,50	Natural Sciences and their Teaching	4,50	4/1
Learning of social sciences	4,50	Social Sciences and their Teaching	4,50	4/1

Recommended knowledge

Not stablished.

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 Explain basic principles and fundamental laws of the Sciences of Nature, worked in the subject, necessary for the exercise of Early Childhood Education teacher, applying them to situations of everyday life.

R2 Identifies and applies the procedures and attitudes that characterize the scientific work as well as those appropriate behaviors for the conservation of the environment and respect for the person.

R3 Recognizes and interprets the foundations of the Didactics of Nature Sciences in Early Childhood Education and applies them in the design of learning situations contextualized in everyday life and attending to diversity.

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
CB1	That students have demonstrated possession and understanding of knowledge in an area of study that builds on the foundation of general secondary education, and is usually at a level that, while relying on advanced textbooks, also includes some aspects that involve knowledge from the cutting edge of their field of study.		x		
CB2	That students know how to apply their knowledge to their work or vocation in a professional manner and possess the skills that are usually demonstrated through the development and defense of arguments and problem solving within their area of study.			x	
CB3	That students have the ability to gather and interpret relevant data (usually within their area of study) to make judgments that include a reflection on relevant social, scientific or ethical issues.			x	
CB4	That students can convey information, ideas, problems and solutions to both specialized and non-specialized audiences.			x	
CB5	That students have developed those learning skills necessary to undertake further studies with a high degree of autonomy.		x		

GENERAL		Weighting			
		1	2	3	4
G1	To know the objectives, curricular contents and evaluation criteria of Early Childhood Education.				x
G2	To promote and facilitate learning in early childhood, from a globalizing and integrating perspective of the different cognitive, emotional, psychomotor and volitional dimensions.			x	
G3	To design and regulate learning spaces in contexts of diversity that address the unique educational needs of students, gender equality, equity and respect for human rights.			x	

G5	To reflect as a group on the acceptance of rules and respect for others. Promote the autonomy and uniqueness of each student as factors in the education of emotions, feelings and values in early childhood.	x			
G11	To reflect on classroom practices to innovate and improve teaching. To acquire habits and skills for autonomous and cooperative learning and promote it in students.			x	

SPECIFIC		Weighting			
		1	2	3	4
E35	To know the scientific, mathematical and technological foundations of the curriculum of this stage as well as the theories on the acquisition and development of the corresponding learning.				x
E38	To know the scientific methodology and promote scientific thinking and experimentation.				x
E40	To know the most outstanding moments in the history of science and technology and their transcendence.			x	
E41	To elaborate didactic proposals in relation to the interaction between science, technology, society and sustainable development.				x
E42	To promote interest and respect for the natural, social and cultural environment through appropriate educational projects. Encourage experiences of initiation to information and communication technologies.				x

Assessment system for the acquisition of competencies and grading system

Assessed learning outcomes	Granted percentage	Assessment method
R1, R2, R3	90,00%	Written test: Final summative or continuous theoretical and practical test (open questions, objective test questions, truncated exam, etc.). Preparation of fieldwork memorandums. Solution of case studies, single case, etc.
R1, R2, R3	0,00%	Oral presentation of group and individual work.
R1, R2, R3	10,00%	Individual monitoring of attendance at face-to-face sessions and active participation in theoretical and practical classes, seminars and tutorials.

Observations

The evaluation includes several clearly differentiated instruments. The final grade will be the weighted average of the results obtained in each of them, provided that all have been passed with a minimum score of 5.
All assignments will have a specific execution and submission date. Assignments or practicals that are not submitted on time and in the correct format through the Platform will not be accepted.
All oral and written production by students will be formally evaluated according to the document *"C1 Level (Common European Framework of Reference for Languages) in the Degrees of Early Childhood and Primary Education."*
Criteria for awarding Honors Distinction: A grade equal to or higher than 9 in each of the evaluation instruments, including regular attendance and participation in class.
Grades from passed parts of a course will not be carried over from one academic year to another.
Regarding the evaluation instrument, written tests:
·50% will correspond to a final individual exam that will include a practical part, multiple-choice and/or essay questions on the course content.
·10% will be based on fieldwork and/or solving practical cases in class.
·30% will be a final group project for the course.
Single Evaluation: Exceptionally, students who cannot participate in the continuous assessment system due to not attending at least 70% of the classes may opt for this evaluation system.
In such cases, the evaluation will be as follows:
·Written test: A final or continuous summative theoretical-practical test (open-ended questions, objective test questions, multiple-choice, etc.), preparation of fieldwork reports, solving practical cases, single case analysis, etc. (90%).

·50% corresponds to a final individual exam including a practical part, multiple-choice and/or essay questions on the course content.
·10% for fieldwork and/or solving practical cases.
·30% for a final individual or group project for the course.
·Learning outcomes assessed: R1, R2, R3
·Individual follow-up in tutorial sessions: (10%)
·Learning outcomes assessed: R1, R2, R3
Artificial Intelligence (AI):
·Students may use AI for personal study of the subject.
·Students may not use AI for completing graded tasks, unless it is specifically required for a particular activity and the instructor indicates so.
·If AI is used in any activity, it must be cited, indicating which part of the activity it was used for, which AI tool was used, and for what purpose.

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 PARTICIPATIVE MASTERCLASS

M2 CLASSROOM PRACTICES

M4 APPRENTICESHIP CONTRACTS

M6 PROBLEM-BASED LEARNING

M7 GROUP TUTORING

M8 INDIVIDUAL TUTORING

M9 PROJECT-BASED LEARNING

IN-CLASS LEARNING ACTIVITIES

	LEARNING OUTCOMES	HOURS	ECTS
Presentation of content by the teacher, analysis of competences, explanation and demonstration of skills, abilities and knowledge in the classroom. M1, M2	R1, R2, R3	20,20	0,81
Group work sessions supervised by the teacher, case studies, diagnostic analyses, problems, field studies, computer classroom, visits, data searches, libraries, network, Internet, etc. Meaningful construction of knowledge through student interaction and activity. M2, M6, M7, M8	R1, R2, R3	4,50	0,18
Presentation in plenary. Application of interdisciplinary knowledge M1, M2	R1, R2, R3	13,50	0,54
Personalised attention in small groups. Period of instruction and/or guidance by a tutor with the aim of reviewing and discussing the materials and topics presented in classes, seminars, readings, assignments, etc. M7, M8	R1, R2, R3	4,50	0,18
Set of oral and/or written tests used in the initial, formative or summative assessment of the student. M2	R1, R2, R3	2,30	0,09
TOTAL		**45,00**	**1,80**

LEARNING ACTIVITIES OF AUTONOMOUS WORK

	LEARNING OUTCOMES	HOURS	ECTS
Group preparation of readings, essays, problem solving, seminars, papers, reports, etc. to present or deliver in theory classes, practical classes and/or small group tutorials. Work done on the platform or other virtual spaces. M1, M2, M6, M7	R1, R2, R3	20,30	0,81
Student study: Individual preparation of readings, essays, problem solving, seminars, papers, reports, etc. to present or deliver in theory classes, practical classes and/or small group tutorials. Work done on the platform or other virtual spaces. M1, M2, M6, M7, M8	R1, R2, R3	47,20	1,89
TOTAL		**67,50**	**2,70**

Description of the contents

Description of the necessary contents to acquire the learning outcomes.

Theoretical contents:

Content block	Contents
1. Introduction to scientific knowledge for the teacher in early childhood education.	Processes in Science. Scientific Knowledge and ordinary knowledge. Scientific models.
2. Natural Science Preschool Education Curriculum in the Comunidad Valenciana.	Structure and treatment of the Natural Sciences Curriculum in the Early Childhood Education stage.
3. Learning and teaching of Natural Sciences in Early Childhood Education.	Learning processes of Natural Sciences in Early Childhood Education. Methodological proposals and teaching resources for the teaching of Natural Sciences in Early Childhood Education.

Temporary organization of learning:

Block of content	Number of sessions	Hours
1. Introduction to scientific knowledge for the teacher in early childhood education.	10,50	21,00
2. Natural Science Preschool Education Curriculum in the Comunidad Valenciana.	2,00	4,00
3. Learning and teaching of Natural Sciences in Early Childhood Education.	10,00	20,00

References

Basic references

Amaro, F., Manzanal, A.I. y Cuetos, M.J. (2015). *Didáctica de las Ciencias Naturales y Educación Ambiental en Educación Infantil*. Unir.

Borghi, B.Q. (2005). *Los talleres en educación infantil*. Graó.

Cañas, A., Martín-Díaz, M.J. y Nieda, J. (2007). *Competencia en el conocimiento y la interacción con el medio físico*. Alianza Editorial.

CORRECCIÓN de errores del Decreto 100/2022, de 29 de julio, del Consell, por el cual se establece la ordenación y el currículo de Educación Infantil. Num. 9462 / 03. 11.2022.

DECRETO 100/2022, de 29 de julio, del Consell, por el cual se establece la ordenación y el currículo de Educación Infantil. Num. 9402 / 10.08.2022.

Fernández, R. y Bravo, M. (2015). *Las Ciencias de la Naturaleza en la Educación Infantil*. Pirámide.

Izquierdo, M. (Coord.) (2012). *Química en Infantil y Primaria. Una nueva mirada*. Graó.

Jiménez, M.P. (2007). *Enseñar ciencias*. Graó.

Laguía, J. y Vidal, C. (2006). *Rincones de actividad en la escuela infantil (0 a 6 años)*. Graó.

Liguori, L. y Noste, M.I. (2007). *Didáctica de las Ciencias Naturales. Enseñar Ciencias Naturales*. Eduforma.

Mérida, R., Torres-Porras, J. y Alcántara, J. (2017). *Didáctica de las Ciencias Experimentales en Educación Infantil*. Síntesis.

Moya, M.G., Marín, M.A., Garrido, M.J. y Paulano, M.D. (2004). *Aprendizajes en Educación Infantil. Actividades y experiencia constructivista*. CCS.

Novo, M. (2003). *La educación ambiental. Bases éticas, conceptuales y metodológicas*. Universitas.

Parra, J.M. (2005). *La Educación Infantil: su dimensión didáctica y organizativa*. Grupo Editorial Universitario.

Pedreira, M. (Coord.) (2019). *Ciencia en la primera infancia. 49+1 propuestas de libre elección*. Graó.

Perales, F.J. (Coord.) (2000). *Resolución de problemas*. Síntesis.

Pujol, R. M. (2007). *Didáctica de las ciencias en la educación primaria*. Síntesis.

Ramiro, E. (2010). *La maleta de la ciencia: 60 experimentos de aire y agua y centenares de recursos para todos*. Graó.

Real Decreto 95/2022, de 1 de febrero, por el que se establece la ordenación y las enseñanzas mínimas de la Educación Infantil. Ministerio de Educación y Formación Profesional «BOE» núm. 28, de 02 de febrero de 2022.

Vega, S. (2006). *Ciencia 0-3: laboratorios de ciencias en la escuela infantil*. Graó.

Vega, S. (2011). *Ciencia 3-6: laboratorios de ciencias en la escuela infantil.* Graó.

VV.AA. (2000). *Valores y temas transversales en el currículum*. Graó.

VV.AA. (2002). *Las ciencias en la escuela. Teoría y prácticas*. Graó.

VV.AA. (2004). *Técnicas y actividades. Educación Infantil*. Ceac.

VV.AA. (2009). *Hacemos ciencia en la escuela*. Graó.

Additional references

Aramburu, F. (2000). *Medio Ambiente y Educación*. Síntesis.

Cantó Doménech, J., de Pro Bueno, A., Solbes, J. (2016) ¿Qué ciencias se enseñan y cómo se hace en las aulas de educación infantil? Visión de los maestros en formación inicial. Enseñanza de las Ciencias. 34.3, pp. 25-50.

Carbó, V., Pigrau, T. y Tarín, R.M. (2010). Qué entemen per treballar el tema dels essers vius avui, i dels animals en particular, a Educació Infantil i Primaria? *Perspectiva escolar* 343.

Carbó, V., Pigrau, T. y Tarín, R.M. (2010). Competències i ciencia escolar. Què fem amb el que sabem? *Guix* 364, 65-72.

Gallego, A.P., Castro, J.E. y Rey, J.M. (2008). El pensamiento científico en los niños y las niñas: algunas consideraciones e implicaciones *IIEC 3*(2), 22-29.

Garrido, J.M., Perales, F.J. y Galdón, M. (2009). *Ciencia para educadores* Pearson.

Gil, D. y Vilches, A. (2006). Educación ciudadana y alfabetización científica: Mitos y realidades *Revista Iberoamericana de educación* 42, 31-53.

Prieto, T., Blanco, A. y González, F. (2000). *La materia y los materiales*. Síntesis.

Rojo, A. (2010). *La física en la vida cotidiana*. RBA.

Sabariego, J.M. y Manzanares, M. (2006). Alfabetización científica. *I Congreso Iberoamericano de Ciencia, Tecnología, Sociedad e Innovación CTS+I.*

Sanmartí, N. (2004). *Aprendre ciències: Connectar l'experiència, el pensament i la parla a través de models*
http://actE354.campus.acte.cat/essersvius/sessions/3_maneresdemirar/aprendre_ciencies.pdf

Sanmartí, N., Burgoa, B. y Nuño, T. (2011). ¿Por qué el alumnado tiene dificultad para utilizar sus conocimientos científico escolares en situaciones cotidianas?, *Alambique. Didáctica de las Ciencias Experimentales* 67, 62-69.

Tomás, A. (Coord.) (2008). *Física y Química enlatadas*. Aguaclara.

Tonucci, F. (1995). El niño y la ciencia. En *Con ojos de maestro*. Troquel, 85-107.

Vilches, A. y Gil, D. (2011). El trabajo cooperativo en las clases de ciencias. Una estrategia imprescindible pero aún infrautilizada. *Alambique. Didáctica de las Ciencias Experimentales* 69, 73-79.

VV.AA. (2000). *El gran libro de los experimentos*. San Pablo.

Web sites
http://newton.cnice.mec.es/materiales_didacticos.html
Proyecto Newton. Página elaborada por el Ministerio de Educación sobre el área de Ciencias de la Naturaleza (Física y Química).

http://recursostic.educacion.es/ciencias/biosfera/web/
Proyecto Biosfera. Página elaborada por el Ministerio de Educación sobre el área de Ciencias de la Naturaleza (Biología y Geología).

http://ntic.educacion.es/v5/web/profesores/asignaturas/
Instituto de Tecnologías Educativas. Ministerio de Educación. Recursos educativos clasificados.

http://www.ite.educacion.es/es/recursos
Instituto Nacional de Tecnologías Educativas y de Formación del Profesorado. Ministerio de Educación.

http://www.csicenlaescuela.csic.es/
CSIC en la escuela. Recursos y experiencias de ciencias en Infantil, Primaria y Secundaria (Consejo Superior de Investigaciones Científicas - Ministerio de Economía y Competitividad).

http://www.ciudadciencia.es/
Ciudad Ciencia, un lugar de encuentro entre ciencia y sociedad, CSIC (Consejo Superior de Investigaciones Científicas - Ministerio de Economía y Competitividad).

http://www.magrama.gob.es/es/ceneam/recursos/documentos/serieea/agenda.aspx Guía para hacer la Agenda 21 escolar, Ministerio de Medio Ambiente.

http://mestreacasa.gva.es/web/guest/inicio
Mestre a casa. Recursos educativos variados para Infantil, Primaria, Secundaria, Bachillerato y Ciclos Formativos (Generalitat Valenciana).

http://www.agroambient.gva.es/
Página oficial de la Conselleria de Agricultura, Medio Ambiente, Cambio Climático y Desarrollo Rural. Información sobre medio natural, espacios protegidos, calidad ambiental y educación ambiental.

http://www.agroambient.gva.es/web/ceacv
Centro de Educación Ambiental de la Comunidad Valenciana, Generalitat Valenciana.

http://www.juntadeandalucia.es/averroes/
Averroes, Red Telemática Educativa de Andalucía (Junta de Andalucía).

http://www.juntadeandalucia.es/educacion/webportal/web/educacion-ambiental/aula-verde
Revista “Aula Verde” de Educación Ambiental, Junta de Andalucía.

http://www.iesaguilarycano.com/dpto/fyq/mat/mat1.htm
Laboratorio virtual “La Materia”. Junta de Andalucía

http://www.juntadeandalucia.es/averroes/ies_sierra_magina/d_fyq/laboratorio%20virtual.htm
Laboratorio virtual de Física y Química. Junta de Andalucía.

http://www.edu365.cat/
Edu365.Cat (Departament d'Ensenyament - Generalitat de Catalunya).

http://www.ibercajalav.net/
Laboratorio virtual Ibercaja.