



Universitat de Lleida

DEGREE CURRICULUM
**LEARNING OF NATURAL
SCIENCES**

Coordination: AGUILAR CAMAÑO, DAVID

Academic year 2023-24

Subject's general information

Subject name	LEARNING OF NATURAL SCIENCES			
Code	100716			
Semester	1st Q(SEMESTER) CONTINUED EVALUATION			
Typology	Degree	Course	Character	Modality
	Bachelor's Degree in Pre-School Education	2	COMPULSORY	Attendance-based
Course number of credits (ECTS)	6			
Type of activity, credits, and groups	Activity type	PRAULA		TEORIA
	Number of credits	1.8		4.2
	Number of groups	2		2
Coordination	AGUILAR CAMAÑO, DAVID			
Department	EDUCATION SCIENCES			
Important information on data processing	Consult this link for more information.			

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
AGUILAR CAMAÑO, DAVID	david.aguilar@udl.cat	6	
PINTO PAGES, ESTHER	ester.pinto@udl.cat	6	

Learning objectives

The subject proposes that the students attain the following objectives of learning:

LO1. To identify and value the contributions of the experimental sciences as a cultural field of the society and its importance at the nurture.

LO2. To acquire fundamental scientific knowledge to understand the ongoing world.

LO3. To deepen at the thinking, speaking and scientific writing.

LO4. To know the early childhood curriculum and the part corresponding to the learning of experimental science.

LO5. To learn and apply the scientific model of matter, energy and life.

LO6. To analyse didactic situations that take place at the kindergarten school, identifying the purpose, the concepts and the performed scientific processes.

OA7. To incorporate strategies and educative proposals aimed at early childhood depending on the sociocultural environment.

LO8. To read and reason texts and research articles about teaching and learning science in early childhood education.

LO9. To learn to work in small groups, cooperating and collaborating autonomously in order to perform the asked tasks.

Competences

The competences that the students of the Master's Degree in Early Childhood Education have to acquire in the subject "Learning of Natural Sciences" are the following:

General Competences

GC1 Correction in oral and written communication.

GC3 Mastery of Information and Communication Technologies

GC7 Manage the appropriate information for the development of the functions of the profession. Knowing and understanding the changing social reality in which he/she develops his educational work. Recognize changes in

society and know how to evolve with them. Know how to change.

Specific Competences

SC1 Know the objectives, curricular contents and evaluation criteria of Early Childhood Education

SC3 Design and regulate learning spaces in diverse contexts that meet the unique educational needs of students, gender equality, equity and respect for human rights.

SC5 Reflect in group on the acceptance of norms 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.

SC11 Reflect on classroom practices to innovate and improve teaching work Acquire habits and skills for autonomous and cooperative learning and promote it in students

The competences that the students of the Master's Degree in Early Childhood Education have to acquire in the subject "Learning Natural Sciences" are the following:

Subject contents

Block 1. The social and educational importance of sciences. Relevance of the experimental sciences to understand the current world. Scientific literacy in childhood. The early childhood education curriculum corresponding to the area of experimental science. Models and principles of teaching and learning science in early childhood education. Constructivist conception.

Block 2. Scientific practices. Introduction to the scientific practices and skills. Scientific inquiry in early childhood education: exploration, experimentation, explication (cognitive and cognitive-linguistic skills) and the evolution of the scientific ideas.

Block 3. The organization and management of the classroom in the teaching of experimental sciences. Classroom organizations for learning natural sciences in early childhood education: materials, science corners and spaces for scientific learning. The role of the teacher. The classroom as a space for research: the observation process in the classroom; observation guidelines. Analysis of real case studies.

Block 4. Matter and Energy Model. The concept of matter and its properties in early childhood education: materials, mass and volume. States and conservation of matter. Forces and interactions between materials. The concept of energy in early childhood education. Resources and proposals for inquiry activities for early childhood education related to the matter and energy model: analysis of real case studies.

Block 5. Model of Life. The concepts of evolution and adaptation of living organisms in the classroom. Essential characteristics of animals and plants, and their diversity. Resources and proposals for inquiry activities for early childhood education related to the Life model: analysis of real case studies. Didactic visits in early childhood education: La Mitjana Natural Park in the city of Lleida.

The Gestions Creatives group develops a 6th block corresponding to the Creative Action named "Science Spaces 0-6". This action corresponds to the Research itinerary of the aforementioned singularity. This itinerary aims to promote an attitude of inquiry towards the physical and social environment to develop a broader knowledge and critical thinking that promotes interaction with reality. (http://www.gestionscreatives.udl.cat/?page_id=189).

In this action, pre-service teachers work collaboratively in groups of 3-5 people, integrating pedagogy and technology, in a process of training, review and reflection on the elements and dynamics that can be part of this new science spaces for foster children's scientific thinking. The action consists of the following four phases that take place throughout the academic year: 1) Initial contact with the school context where students will intervene; creation of a work team made up of students, university teachers and school teachers; 2) Design of the educational resources and educative proposals that will form part of the science space. Each group of pre-service teachers is

responsible for the design and creation of a specific scientific proposal; 3) Piloting of scientific proposals: video-recording of the actions that early childhood students carry out in the different proposals; analysis of the behaviors and scientific processes that children perform when interact with the designed scientific proposals; 4) Review and improvement of the proposals and final implementation of the science space.

Methodology

GESTIONS CREATIVES GROUP

- Expository lessons
- Project-based learning
- Problem-based learning
- Case-based learning
- Cooperative work
- Monitoring of individual or group work
- Exhibitions and / or debates of work / didactic proposals
- Reflective learning
- Field trips
- Tutoring
- Written tests
- Readings

The implementation of online teaching will mean that during the virtual sessions activities will be based on *flipped classroom methodologies, problem-based and case-based learning (autonomous activities) and readings of articles and documents related to science learning during the early childhood education.*

AFTERNOON GROUP

- Expository lessons
- Case-based learning
- Monitoring of individual or group work
- Exhibitions and / or debates of work / didactic proposals
- Reflective learning Tutoring
- Written tests
- Readings

Development plan

The following table shows the different training activities that take place in each of the blocks of the subject, which can be carried out simultaneously with the whole group, in small groups of students or individually.

Table. Training activities that take place in each block of the subject and their timing

Blok	Activity	Characteristics	Week of implementation of the activity
1, 2, 3, 4 i 5	Content exposition	Whole group of students	1, 2, 3, 6, 8, 12
2, 4 i 5	Problem-based learning activities	Small group of 3-5 students	4, 5, 9, 10, 13, 14
3, 4 i 5	Case-based learning activities	Grup reduït de 3-5 estudiants	7, 11, 15
4 i 5	Reading and reflection of articles	Individual	11, 15
5	Field trip	Whole group of students	14

Evaluation

GESTIONS CREATIVES GROUP

Assessment evidences will be collected from both the activities carried out in the whole group sessions and in the Creative Action (Science Spaces 0-6). The following table shows the assessment evidences, indicating the modality with which they are carried out (individually or in small group of students) and the weighting in the final qualification:

Table. Assessment evidences

	Evidences	Weight
Evidences collected from the whole group sessions (70%)	Problem-based activity (small group of students)	25 %
	Exam (individual)	45 %
Evidences collected from the Creative Action (30%)	Report about the desing, creation and analysis of a scientif proposal aimed to early childhood education (small group of students)	30 %

The subject will not be passed if a mark of 4.0 or more is not obtained in any evidence that wheights 30% or more. The final average mark must exceed 5.0.

AFTERNOON GROUP

- Exams 35 %
- Problem-based activities based on real-life situations 30 %
- Forum 20 %
- Oral expositions 15 %

The subject will not be passed if a mark of 4.0 or more is not obtained in any evidence that wheights 30% or more. The final average mark must exceed 5.0.

Bibliography

AAVV. (2009). Experimentar con materiales. Aula de Educación Infantil, 52.

Basora, A. (2012). *Química en infantil y primaria* (Vol. 2). Grao.

Coll, C., Mauri, T., i Rochera, M.J. (2012). La práctica de evaluación como contexto para aprender a ser un

aprendiz competente. *Revista de currículum y formación del profesorado*, 16(1), 49-59.

Daza, S. F., Quintanilla, M. R., Muñoz, E. L. i Arrieta, J. R. (2011). La ciencia como cultura y cultura de la ciencia: su contribución en el desarrollo de pensamiento científico en los niños. En *La enseñanza de las ciencias naturales en las primeras edades* (Vol.5, p. 326). Colombia.

de Miguel Díaz, M., Alfaro Rocher, I., Apodaca Urquijo, P., Arias Blanco, J., García Jiménez, E., i Lobato Fraile, C. (2006). *Metodologías de enseñanza y aprendizaje para el desarrollo de competencias: orientaciones para el profesorado universitario ante el Espacio Europeo de Educación Superior*. Madrid: Alianza editorial.

Eshach, H., i Fried, M. N. (2005). Should science be taught in early childhood? *Journal of Science Education and Technology*, 14(3), pp. 315-336.

Fleer, M., i Hardy, T. (2001). *Science for children: Developing a personal approach to teaching*, 2nd Ed. New South Wales: Prentice-Hall.

Gené, A. (2007). *Pensar, que bé!*. Com acompanyar els infants a descobrir el món. Ed. Pages.Lleida

Huber, G. (2008). Aprendizaje activo y metodologías educativas. *Revista de Educación*, 59-81.

NGSS Lead States. (2013). *Next Generation Science Standards: For States, By States*. Washington, DC: The National Academies Press.

Osborne, J. (2014). Teaching scientific practices: Meeting the challenge of change. *Journal of Science Teacher Education*, 25(2), 177-196.

Pedreira, M. (2013). *Experimentar, quin repte*. Manresa: FUB.

Pedreira, M., i Márquez, C. (2016). Espacios generadores de conocimiento. *Cuadernos de Pedagogía*, (466), 46-49.

Pedreira, M., i Márquez, C. (2017). Enabling positive experiences in an informal learning environment for the youngest ages. *Journal of Emergent Science*, 14, 6-15

Pedreira, M. (2019). *Ciència des del néixer. 49+1 propostes de lliure elecció*. Grao.

Pujol, R.M. (2003). *Didáctica de las ciencias en la educación primaria*. Madrid: Síntesis

Smith, K. (2015). The role of research in teacher education. *Research in Teacher Education*, 5, 43-46.