UAB
Universitat Autònoma de Barcelona

Laboratory and Virtuality in Primary Education

Code: 102088
ECTS Credits: 6

2025/2026

Degree	Type	Year
Primary Education	OT	4

Contact

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Teachers

Bernat Rios Rubiras

Teaching groups languages

You can view this information at the end of this document.

Prerequisites

Students should have already passed the two previous courses "*Ensenyament i Aprenentatge del Coneixement del Medi Natural, Social i Cultural*" in 2nd year and "*Didàctica de les ciències experimentals*" in 3rd year.

Objectives and Contextualisation

The course "Laboratori i Virtualitat" aims that participants, at the end of the course, will be able to:

1. Know and know how to use the different existing ICT for science teaching and learning (virtual tools, digital devices, mobile technology, etc.).
2. Understand the characteristics of the experimental work in primary education and how this can be supported by various ICT.
3. Incorporate ICT in science education, integrating them across all the educational planning.
4. Identify positive and negative aspects of each teaching ICT.
5. Provide reflections on the educational changes that implies introducing ICT in school.
6. Acquire criteria for selecting, using and designing virtual environments that foster scientific skills (exploration, observation, classification, prediction, variables control, etc.).
7. Familiarize with creative technologies as resources to work from technology to primary content

Competences

- Design and regulate learning spaces in contexts of diversity that take into account gender equality, equity and respect for human rights and observe the values of public education.
- Design, plan and evaluate education and learning processes, both individually and in collaboration with other teachers and professionals at the centre.
- Develop the functions of tutoring and guidance of pupils and their families, attending to the pupils' own needs. Understand that a teacher's functions must be perfected and adapted in a lifelong manner to scientific, pedagogical and social changes.
- Foster reading and critical analysis of the texts in different scientific fields and cultural contents in the school curriculum.
- Know and apply information and communication technologies to classrooms.
- Know the curricular areas of Primary Education, the interdisciplinary relation between them, the evaluation criteria and the body of didactic knowledge regarding the respective procedures of education and learning.
- Make changes to methods and processes in the area of knowledge in order to provide innovative responses to society's needs and demands.
- Reflect on classroom experiences in order to innovate and improve teaching work. Acquire skills and habits for autonomous and cooperative learning and promote it among pupils.
- Work in teams and with teams (in the same field or interdisciplinary).

Learning Outcomes

1. Analyse a situation and identify its points for improvement.
2. Identify situations in which a change or improvement is needed.
3. Identifying aspects common to all the experimental sciences and examining them in depth.
4. Identifying, describing, and analysing the characteristics pertaining to management of the area of experimental sciences in the classroom, and the implementation of activities involving experimentation and the use of CLTs.
5. Identifying the difficulties in the teaching and learning of experimental sciences, and designing activities that respond to the diversity of students' learning experiences.
6. Knowing how to communicate and present an argument in science lessons.
7. Planning for scientific learning situations in contexts outside of the school.
8. Produce and apply resources related to the teaching and learning of experimental sciences.
9. Propose new methods or well-founded alternative solutions.
10. Propose new ways for measuring success or failure on implementing innovative proposals or ideas.
11. Relating science with its technological applications, with its social impact on the didactic situations pertaining to the school.
12. Weigh up the risks and opportunities of both one's own and other people's proposals for improvement.

Content

Section 1: ICT and scientific practice in classroom. Which ICT shoud we use, when, how and why?

Section 2: Digital tools for enriching the experimental activities in school: mobilephones, digital sensors, digital lenses and videos.

Section 3: Digital tools for working with virtual models in the classroom: animations, simulations, video games and virtual laboratories.

Section 4: Digital tools to communicate scientifically: interactive whiteboard and Scratch language.
Section 5: Digital tools to address the content of technology in the primary classroom (creative technologies)

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Section 1	5	0.2	8, 4, 7, 11, 6
Section 2	15	0.6	8, 4, 7, 11, 6
Section 3	15	0.6	8, 3, 4, 5, 7, 11, 6
Section 4	10	0.4	8, 4, 7, 11, 6
Section 5	5	0.2	3, 7
Type: Supervised			
Project and final reflections preparation tutorials	11	0.44	
Tutories Section 5	4	0.16	
Tutoring Section 2	5	0.2	
Tutoring Section 3	5	0.2	
Tutoring Section 4	5	0.2	
Type: Autonomous			
Autonomous work for elaboration of deliberables	60	2.4	8, 4, 7, 11, 6
Preparation of final project	10	0.4	8, 4, 5, 7, 11, 6

The course "Laboratori i Virtualitat" combines different kind of work: laboratory experimental activities, experimental field activities and computer room activities. Is particularly important work in small groups and whole-class discussions.

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Assessment

Continous Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Activity with ICT 1	20%	0	0	8, 4, 7, 10, 11, 6
Clasroom participation	10%	0	0	12, 9, 11
Delivery of individual tasks	20%	0	0	8, 4, 7, 11, 6
Digitization project	20%	0	0	1, 8, 4, 2
Final project	20%	0	0	8, 3, 4, 5, 7, 11, 6

Pre-Post Reflection	10%	0	0	8, 3, 4, 5, 7, 11, 6

The evaluation of the subject Laboratory and Virtuality will be based on continuous evaluation and will have different sections:

- Class participation: 10% (single).
- Individual deliveries (2 in total along the course): 10% each; 20% in total (single). (the deadline will be after get over the first 1/3 of the course)
- Preparation of a classroom activity with ICT and TAC: 20% (microteaching throughout the course) 10% presentation (group) and 10% reflection (single).
- Initial and final reflection: 10% (single).
- Digitization project of a school space: 20%. (at the last two sessions)
- Research project in the field of science with ICT tools and TAC: 20%. (at the end of the course)

It should be taken into account that:

- In accordance with UAB regulations, plagiarism or copying of any work will be penalized with a grade of 0, losing the possibility of retaking it, whether it is an individual or group work (in this case, all group members will have a 0).
- Class attendance is mandatory: students must attend all classes to be evaluated following continuous assessment (20% of justified incidents are considered), otherwise they will be considered non-assessable and the student will have to go to re-take, as long as the following condition is met.
- Students who have handed in 2/3 of the assignments have the right to re-take, which will take place on February 4.
- The re-take will consist of a practical laboratory, a FabLab practice and a theoretical part (Each practice will be 30% of the final grade and theoretical one will be 40%. In order to average the numerical value of each test, it will have to exceed 4 out of 10).
- There is no synthesis test.
- The use of AI is not allowed in evaluative activities, and its use will result in failing the activity.

Single assessment

- This subject includes a single assessment, which will take place on December 18. The test will consist of a practical laboratory, a FabLab practice and a theoretical part (Each practice will be 30% of the final grade and theoretical one will be 40%. In order to average the numerical value of each test, it will have to exceed 4 out of 10).
- The attendance condition is the same as the continuing assessment.
- The recovery procedure and conditions are the same as for continuous assessment, and will take place on February.

Bibliography

Chivite, J. (2010). Com influencia la temperatura en el creixement de les hortalisses en un hivernacle. *Ciències. Revista del Professorat de Ciències d'Infantil, Primària i Secundària,* 17, 2-6.

Colette Murphy (2003). *Literature Review in Primary Science and ICT*. A NESTA Futurelab Series - report 5.

Demkanin, P., Kibble, B., Lavonen, J. Josefa Guitart Mas, Jozefina Turlo (2008). *Effective use of ICT in Science Education*. University of Edinburg.

Hennessy, S., Wishart, J., Whitelock, D., Deaney, R., Brawn, R., la Velle, L., McFarlane, A., Ruthven, K. and Winterbottom, M. (2007). Pedagogical approaches for technology-integrated science teaching. *Computers and Education*, 48 (1), 137-152.

López, V. i Hernández, M.I. (2013). El Scratch com a eina de modelització computacional. *Ciències. Revista del Professorat de Ciències d'Infantil, Primària i Secundària,* 26, 28-33.

Osborne, J., Hennessy, S. (2003). *Literature Review in Science Education and the Role of ICT: Promise, Problems and Future Directions*. A NESTA Futurelab Research report - report 6.

Pintó, R., Couso, D., Hernández, M.I. (2010) An inquiry-oriented approach for making the best use of ICT in the science classroom. *e-Learning papers,* 20, 1-14.

Software

- Scratch

- Microbit

- Tinkercad

Groups and Languages

Please note that this information is provisional until 30 November 2025. You can check it through this link. To consult the language you will need to enter the CODE of the subject.

Name	Group	Language	Semester	Turn
(PLAB) Practical laboratories	20	Catalan	first semester	afternoon