



Universitat de Lleida

DEGREE CURRICULUM
**RESOLUTION OF STEM
CHALLENGES**

Coordination: MARIN JUARROS, VICTORIA IRENE

Academic year 2022-23

Subject's general information

Subject name	RESOLUTION OF STEM CHALLENGES			
Code	100994			
Semester	1st Q(SEMESTER) CONTINUED EVALUATION			
Typology	Degree	Course	Character	Modality
	Bachelor's Degree in Primary Training	4	OPTIONAL	Attendance-based
	Double bachelor's degree: Degree in Pre-school Education and Degree in Primary Training	5	OPTIONAL	Attendance-based
	Double bachelor's degree: Degree in Primary Training and Degree in Physical Activity and Sports Sciences	5	OPTIONAL	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	1		1
Coordination	MARIN JUARROS, VICTORIA IRENE			
Department	PEDAGOGIA			
Important information on data processing	Consult this link for more information.			
Language	Catalan 80% Spanish 10% English 10%			

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
MARIN JUARROS, VICTORIA IRENE	victoria.marin@udl.cat	2	
PEIRO CARDET, JOSEP	josep.peiro@udl.cat	2	
SERRANO ALARCON, SANTIAGO	santiago.serrano@udl.cat	2	

Subject's extra information

- Design, planning of STEM proposals
- Implementation of STEM proposals
- Analysis and evaluation of STEM proposals
- Participation and external communication of STEM proposals

Learning objectives

1. Identify and locate resources to respond to social challenges through STEM.
2. Integrate and apply STEM knowledge to create innovative solutions to social challenges.
3. Design and develop STEM challenges as pedagogical proposals for primary education.
4. Evaluate the quality of STEM projects, both your own and those of others.
5. Present your own STEM projects to a variety of audiences.

Competences

BASIC SKILLS

CB02: Apply their knowledge to their work or vocation in a professional way and possess the competencies that are usually demonstrated through the elaboration and defense of arguments and the resolution of problems within their area of study.

CB03: Gather and interpret relevant data (usually within their study area) to make judgments that include a reflection on relevant issues of a social, scientific or ethical nature.

CB04: transmitting information, ideas, problems and solutions to both specialized and non-specialized audiences)

GENERAL COMPETENCES

CG01. To promote democratic values, with special emphasis on tolerance, solidarity, justice and non-violence, and to know and value human rights.

CG02. Know the intercultural reality and develop attitudes of respect, tolerance and solidarity towards different social and cultural groups.

CG03. Know the right to equal treatment and opportunities between women and men, in particular by eliminating discrimination against women, whatever their circumstance or condition, in any of the areas of life.

CG04. Know the measures that guarantee and make effective the right to equal opportunities for people with disabilities.

CG05. Develop the ability to critically analyze and reflect on the need to eliminate all forms of discrimination, direct or indirect, in particular racial discrimination, discrimination against women, that derived from sexual orientation or that caused by a disability.

CG06. Assume the commitment of personal and professional development with oneself and the community. Adapt the learning proposals to the most significant cultural evolutions.

SPECIFIC COMPETENCES

CE01: Know 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.

CE02: Design, plan and evaluate teaching and learning processes, both individually and in collaboration with other teachers and professionals at the center.

CE04: Encourage reading and critical comment on texts from the various scientific and cultural domains contained in the school curriculum.

CE09: Assume that the exercise of the teaching function has to be perfected and adapted to scientific, pedagogical and social changes throughout life.

CE14: Reflect on classroom practices to innovate and improve teaching work.

CE15: Acquire habits and skills for autonomous and cooperative learning and promote it among students.

CE16: Selectively discern audiovisual information that contributes to learning, civic training and cultural wealth.

CE.17. Understand the role, possibilities and limits of education in today's society and the fundamental competencies that affect primary schools and their professionals.

TRANSVERAL COMPETENCES

CT03: Acquire training in the use of new technologies and information and communication technologies.

CT04: Acquire basic knowledge of entrepreneurship and professional environments.

CT05: Acquire essential notions of scientific thought.

Subject contents

Theme 1: Defining and analysing STEM problems and challenges

Identifying societal challenges. Obtaining data and resources. Relation with previous STEM concepts.

Topic 2: Design and development of STEM challenges.

Prototyping and creation of STEM solutions.

Topic 3: Design of STEM pedagogical proposals.

STEM educational scenarios. Design of STEM challenges as pedagogical proposals.

Topic 4: Presentation and evaluation of STEM challenges.

Quality criteria for STEM projects. Self-assessment, co-assessment, heteroassessment. Presentation of STEM projects.

Methodology

- Case-based learning Individual works
- Tutorships
- Field work
- Project / problem-based learning
- Readings / bibliographic consultation
- Personal study
- Exhibitions and / or work debates / didactic proposals
- Monitoring of individual / group work
- Written tests / performance of work

Development plan

Activities	Contents	Schedule
Formulation of a STEM challenge	Topic 1	Week 1
Resolution of a STEM challenge and creation of a prototype	Topic 2	Weeks 2 & 3
Design of a pedagogical proposal based on a STEM challenge	Topic 3	Week 4
Public presentation and co-evaluation of a STEM challenge	Topic 4	Week 5

Evaluation

- **Design, development, implementation, evaluation and presentation of a STEM challenge (in groups): 50%**

Includes the formulation of a challenge and its resolution through the development of a prototype. The final delivery format is a video (10-12 minutes). Instructions will be provided at the beginning of the course. The evaluation will include the participation of the other groups and will take place in a final session of presentation of the challenges.

At least two moments of delivery and follow-up of the work to group tutorials (evaluable) will be established before the final delivery.

Assessment criteria: 1) work based on a challenge or a good researchable question, 2) integration of S elements of STEM (Science), 3) integration of T elements of STEM (Technology), 4) integration of M elements of STEM (Mathematics), 5) STEM integration, 6) originality and creativity, 7) didactic application, 8) transversal competences, 9) presentation (group and individual assessment), 10) video (group and individual assessment).

- **Design of STEM pedagogical proposal (group): 25%**

Includes the elaboration of material and documentation by the school of a pedagogical proposal in Primary Education based on the challenge developed.

- **STEM portfolio (individual): 25%**

As the final delivery of the STEM portfolio, it is essential to document the work and decision-making processes of the other evaluation activities of the subject, as well as the reflection on the proposal itself and others. The final integration of the different subjects of the mention and of the STEM learning carried out is also considered very

relevant.

Assessment criteria: a) description and reflection of the work and decision-making processes of the subject's assessment activities (reflective diary), b) regularity in the work in the reflective diary, c) justified and thoughtful inclusion of enriching elements of the STEM process, sources of inspiration, examples not integrated into the assessment activities, reflection on didactic possibilities, d) individual contribution to the challenge, e) final presentation and structure, integration of the different subjects of the specialisation and of STEM knowledge.

ALTERNATIVE ASSESSMENT

Students who fulfil the alternative assessment requirements will have to carry out the same activities, individually. The weighting criteria are those established for each activity. The deadlines and assessment criteria are the same as those applied to continuous assessment students.

Bibliography

Liston, M. (2018). Designing Meaningful STEM Lessons. *Science*, 53(4), 34-37.

<https://pdst.ie/sites/default/files/Designing%20meaningful%20STEM%20lessons%20Dr.%20Maeve%20Liston.pdf>

López Simó, V., Couso Lagarón, D., & Simarro Rodríguez, C. (2020). Educación STEM en y para el mundo digital: El papel de las herramientas digitales en el desempeño de prácticas científicas, ingenieriles y matemáticas. *Revista de Educación a Distancia (RED)*, 20(62). <https://doi.org/10.6018/red.410011>

Kelley, T. R. & Knowles, J. G. (2016). A conceptual framework for integrated STEM education. *International Journal of STEM Education*, 3(1), 1–11. <https://doi.org/10.1186/s40594-016-0046-z>

Official documents

Generalitat de Catalunya (2017). Pla STEMcat d'impuls de les vocacions científiques, tecnològiques, en enginyeria i en matemàtiques. <https://projectes.xtec.cat/steamcat/wp-content/uploads/usu1760/2019/09/pla-stem.pdf>

Generalitat de Catalunya (2017). Currículum educació primària (competències bàsiques).

<https://agora.xtec.cat/ceiparturmartorell/wp-content/uploads/usu99/2016/04/curriculum-educacio-primaria.pdf>

Webs

<http://www.scientix.eu/>

<https://www.siemensstemday.com/>

<https://educacion.stem.siemens-stiftung.org/r>