DEGREE CURRICULUM

RESOLUTION OF STEM CHALLENGES

Coordination: MARIN JUARROS, VICTORIA IRENE

Academic year 2023-24

RESOLUTION OF STEM CHALLENGES 2023-24

Subject's general information

<table>
<tr><td>Subject name</td><td>RESOLUTION OF STEM CHALLENGES</td></tr>
<tr><td>Code</td><td>100994</td></tr>
<tr><td>Semester</td><td>1st Q(SEMESTER) CONTINUED EVALUATION</td></tr>
<tr><td>Typology</td><td>
<table>
<tr><th>Degree</th><th>Course</th><th>Character</th><th>Modality</th></tr>
<tr><td>Bachelor's Degree in Primary Training</td><td>4</td><td>OPTIONAL</td><td>Attendance-based</td></tr>
<tr><td>Double bachelor's degree: Degree in Pre-school Education and Degree in Primary Training</td><td>5</td><td>OPTIONAL</td><td>Attendance-based</td></tr>
<tr><td>Double bachelor's degree: Degree in Primary Training and Degree in Physical Activity and Sports Sciences</td><td>5</td><td>OPTIONAL</td><td>Attendance-based</td></tr>
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<tr><td>Course number of credits (ECTS)</td><td>6</td></tr>
<tr><td>Type of activity, credits, and groups</td><td>
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<tr><th>Activity type</th><td>PRAULA</td><td>TEORIA</td></tr>
<tr><th>Number of credits</th><td>1.8</td><td>4.2</td></tr>
<tr><th>Number of groups</th><td>1</td><td>1</td></tr>
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<tr><td>Coordination</td><td>MARIN JUARROS, VICTORIA IRENE</td></tr>
<tr><td>Department</td><td>EDUCATION SCIENCES</td></tr>
<tr><td>Important information on data processing</td><td>Consult this link for more information.</td></tr>
<tr><td>Language</td><td>Catalan</td></tr>
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RESOLUTION OF STEM CHALLENGES 2023-24

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

Subject's extra information

- Due to the dynamics of the subject, there will be times of co-teaching with more than one member of the teaching staff in the same time slot, as well as times of autonomous work by the teaching staff. The specific timetable distribution will be presented at the beginning of the course.

- This course participates in the academic year 2023/2024 in the project "UnimSTEM: proposta integradora universitat-escoles per al desenvolupament de competències STEAM i CDD" (code EDU128/23/000161) subsidised by the Department of Education of the Generalitat de Catalunya in line 2 of the call for proposals Digital impulse to education. Framework of the Recovery, Transformation and Resilience Plan (Next Generation Fund, EU).
  This involves the co-participation of in-service teachers during the course at certain times and in relation to part of the assessment activities (blocks 1 and 2).

Learning objectives

1. Identify and locate scientific 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 prototypes in a collaborative way to respond to social challenges.

4. Evaluate the quality of STEM projects, both their own and others.

5. Present one's own STEM projects to a range 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.

TRANSVERSAL 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

Topic 1: Defining and analysing STEM problems and challenges

Identification and contextualisation of societal challenges. Obtaining, systematically documenting and interpreting data, statistics and scientific resources. Relation to previous STEM concepts.

Topic 2: Design and development of STEM challenges

Generation and assessment of STEM solution ideas. Planning. Prototyping and creation of STEM solutions.

Topic 3: Evaluation and presentation of STEM challenges and solutions

Quality criteria for STEM challenges and solutions. Self-assessment, co-assessment, heteroassessment. Presentation and communication of STEM challenges and solutions.

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
Phase 1: Selection, definition and justification of a STEM challenge. Scientific documentation and argumentation.	Topic 1	Weeks 1 - 2
Phases 2 and 3: Design and development of the STEM challenge. Generation of ideas, prioritisation for the resolution of the challenge. Functional prototype creation.	Topic 2	Weeks 3 - 5
Phases 4 and 5: Assessment and presentation of the challenge. Production of video, communication and co-assessment of challenge and STEM solution.	Topic 3	Weeks 6 - 7

Evaluation

BLOCK 1: Design and development of a STEM challenge and solution: 35%.

- *Assessment activity 1: Definition, contextualisation and scientific argumentation of the challenge (in group): 15%.*
- *Assessment activity 2: Follow-up group tutorials: 10%.*
- *Assessment activity 3: Record of individual contribution: 10%.*

Recoverable block. The minimum mark for the block must be 5 and the maximum mark for the recovery of the block (if applicable) is 5.

BLOCK 2: Evaluation and presentation of STEM challenge and solution: 35%.

- *Assessment activity 1: Video presentation of the STEM challenge and solution (prototype) (in group): 20%.*
- *Assessment activity 2: Oral presentation of the STEM challenge and solution (prototype) (in group): 15%. The assessment will include the participation of the other groups, STEM faculty and in-service teachers.*

Work based on a challenge or a good researchable question and well documented scientifically, the integration of STEM elements and originality and creativity, among other aspects, will be especially valued.

Recoverable block. The minimum mark for the Block must be 5 and the maximum mark for the Block (if applicable) is a 5.

BLOCK 3: Assessment activity STEM Portfolio (individual): 30%.

As the final delivery of the STEM portfolio, it is essential to document in a reflective (and not merely descriptive) way and illustrate in multimedia formats the work and decision-making processes of the other assessment activities of the course, especially those of block 1. It is essential to show the individual contribution to the challenge project and the critical self-evaluation of the project itself. It is also considered very relevant the final integration of the different courses of the minor and the STEM learning carried out.

Recoverable block. The minimum mark for the Block must be 5 and the maximum mark for the Block recovery (if applicable) is a 5.

ALTERNATIVE ASSESSMENT

Due to the dynamics of the course, students who meet the requirements for alternative assessment will have to carry out the same activities, individually. The weighting criteria are those established for each activity and will be adjusted in the case of assessment activities designed for group work (assessment act. 3 of Block 1). The delivery dates and assessment criteria are the same as those applied to students in continuous assessment.

Attendance at the follow-up tutorial (assessment act. 2 of Block 1) and the oral presentation of the challenge project (assessment act. 2 of Block 2) will be compulsory.

ADDITIONAL NOTE

Where applicable, the assessment support measures derived from UdLxTothom will be complied with.

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

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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

Webs
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