

COMPETENCES IN ACTION AND DESIGNING TRANSFORMATIVE PROPOSALS FOR ENVIRONMENTAL CITIZENSHIP EDUCATION (MASTED-02-11)				
DEGREE PROGRAM:		Master in integrated STEAM Education (MASTED)		
SEMESTER: Second	TYPE: Basic	CREDITS: 4 ECTS	WORKLOAD: 100 hours	MENTORING: 6 hours/week
LANGUAGE: Spanish. Support, tutoring and materials in English.				

OBJECTIVES	
General	To provide educators with the knowledge, skills, dispositions and resources necessary to design transformative educational approaches incorporating last trends in STEM, citizenship and sustainability education.
Specific	<ul style="list-style-type: none"> To recognise the key role of the specialised research in developing scientific knowledge about how to design effective and transformative educational interventions. To identify research-based designing principles for effective interventions. To know about different methodological approaches and best practices to promote critical thinking, environmental citizenship, citizen science and eco-social action for sustainability in education. To design activities and projects for the development of action and green competences and eco-social awareness and action, fostering active citizenship participation and engagement through education.

SUBJECT MATTER
<p><u>THEORETICAL SYLLABUS:</u></p> <ul style="list-style-type: none"> Module 1: Toward Sustainability Education Focused on Participation and Action From information and awareness to behavioral change and co-construction of solutions. Environmental citizenship: Action competencies for active, informed, and responsible participation. Green competencies. Lessons from Environmental Education research on transformation. Designing transformative proposals for attitudes, values, and habits. Module 2: Methodological Approaches and Best Practices Focused on Action for Sustainability Inquiry into socio-scientific controversies in Environmental Education and for sustainability. Critical thinking, argumentation, and decision-making. STEAM projects for the development of more sustainable and healthy cities. Open schooling and STEAM education for sustainability. Module 3: The Framework of Citizen Science in Environmental Education General concepts, policies promoting the participatory model through citizen science. Nature-based solutions as a scenario for citizen transformation. Module 4: Environmental Education, Participation, and Social Action Eco-social awareness and education for the future. Competencies for a democratic, sociocritical, and environmental culture. IAP methodology and GED approach in program and project design. Service Learning (APS) and Sustainable Development Goals (ODS), partnerships for actions beyond 2030. <p><u>PRACTICAL SYLLABUS (workshops, field observations, outings, and virtual labs):</u> Design of transformative proposals for values and behaviors: Criteria based on research. Design of Sustainability Education interventions based on Inquiry into Socio-Scientific Controversies. Visit to university facilities used in citizen science and study of successful cases of Citizen Science and Nature-Based Solutions. Observation and analysis with a GED approach of proposals for the development of eco-social awareness in a democratic and socio-critical culture, from IAP, APS, and GED.</p>

COMPETENCES
<ul style="list-style-type: none"> C1: Developing knowledge and understanding in transformative educational approaches.

- C2: Developing advanced cognitive and procedural skills associated with knowledge development and creation.
- C3: Developing of plans and organising and innovating the teaching/learning process, as well as to apply the plan and to assess its application.
- C4: Developing and using of a wide range of strategies to organise the classroom/learning space and foster learning.
- C12: Developing critical literacy competence.
- C13: Developing citizenship competence.
- C17: Embracing complexity in sustainability.
- C18: Acting for sustainability.

LEARNING OUTCOMES

<p>Knowledge</p>	<ul style="list-style-type: none"> • Recognizes the environment as a complex system that allows for a deepening of basic competencies and establishes a solid foundation for comprehensive development. • Understands the epistemological perspectives of environmental education, embracing the critical, complex, transdisciplinary, and constructivist viewpoints as a foundation for an investigative model or the design of intervention strategies in environmental education. • Is familiar with the landscape of research in environmental education for sustainability, including contemporary advances, dissemination strategies, models, and approaches. • Identifies best practices in environmental education for sustainability. • Is acquainted with a wide range of tools and methodologies, as well as environmental education programs (formal and non-formal), innovation, and research in different contexts (urban, educational, natural environments, business, organizations, etc.). • Is familiar with the Sustainable Development Goals and other sustainability strategies at the national and regional levels. • Identifies synergies between Education for Sustainability and Inclusive Education.
<p>Skills</p>	<ul style="list-style-type: none"> • Analyses the main explanatory models applicable to pro-environmental behaviour, considering the interaction of associated psychosocial variables and levels of environmental consciousness. • Analyses and develops proposals for intervention and/or research as an environmental educator based on the principles of sustainability, inclusion, and complexity within the framework of interdisciplinary teams. • Generates evaluation designs within the framework of environmental education and sustainability, incorporating criteria for evaluation in Environmental Education for Sustainability. • Applies the methodological logic of Project-Based Learning (PBL) in a proposal for intervention in environmental education for sustainability. • Utilizes instruments of strategic planning, environmental communication, and citizen participation for the design of programs in different contexts (urban, natural, business, educational). • Applies and manages tools, methodologies, and resources (human, environmental, and material) effectively for the education of an environmentally literate, informed, critical, and participatory citizenship. • Applies national and international standards for evaluation in environmental education for sustainability. • Applies the classroom research approach and identifies it as a creative tool for participation and the construction of shared knowledge.
<p>Attitudes/values</p>	<ul style="list-style-type: none"> • Valorisation of science and scientific research as the big reference for knowledge, socio-scientific development and research-based education. • Respect for others' opinions and different perspectives. • Responsibility for own actions and environmental citizenship.

	<ul style="list-style-type: none"> • Commitment to the development of a well-educated and more sustainable world.
TEACHING METHODS	
<ul style="list-style-type: none"> • Student Self-study (study, readings, self-assessment, exercises, etc.) • Theoretical Activities: Lectures on theoretical-practical content • Practical Activities: Debates, Seminars, lab activities, field trips. • Tutoring: Supervision of directed work, clarification of doubts, comments on individual work, etc. • Assessment Activities. • Cooperative Learning, Project-Based Learning: Seminars, roundtables, debates, colloquiums, forums, etc. <p>Large group lectures will consist of master sessions in which the theoretical part and general examples will be presented.</p> <p>In practical classes, ICT tools will be used, exercises will be solved, practical aspects of designing an innovation or educational research project will be addressed, and preparation for oral presentations and posters to be presented at the Teaching Innovation Days will take place.</p> <p>In these practical sessions, group and collaborative autonomous work will be encouraged, although always guided by the teachers.</p>	
EVALUATION	
<ul style="list-style-type: none"> • Quality of practical work and students' assignments: 40% • Evaluation of theoretical knowledge through written tests and presentations: 30% • Quality of participation and students' engagement: 20% • Self-evaluation and peer-evaluation: 10% 	
PRECONDITIONS	
None	
DEPARTMENT	Didactics of Science and Department of Animal and Plant Biology and Ecology
LECTURERS	Marta Romero Ariza Ana María Abril Gallego María Gema Parra Anguita
LITERATURE	<p>Basic Literature:</p> <ul style="list-style-type: none"> • Consejo de Europa (2021) Reference Framework of Competences for Democratic Culture. https://www.coe.int/en/web/reference-framework-of-competences-for-democratic-culture/rfcdc-volumes • Delgado Algarra, E., Cuenca López, J. M. (2020) (Eds.). Handbook of Research on Citizenship and Heritage Education. IGI-Global • García-Montes, N.; Artanz Monreal, L. (2019) Metodologías participativas para la planificación de la sostenibilidad ambiental local. El caso de la Agenda 21. EMPIRIA. Revista de Metodología de Ciencias Sociales, 43, pp. 109-133. DOI/ empiria.43.2019.25354 • Gough, A., Lee, J. C. K., & Tsang, E. P. K. (Eds.). (2020). Green schools globally: Stories of impact on education for sustainable development. Dordrecht: Springer. • Hadjichambis, A. C., Reis, P., Paraskeva-Hadjichambi, D., Činčera, J., Boeve-de Pauw, J., Gericke, N., & Knippels, M. C. (2020). Conceptualizing environmental citizenship for 21st century education (p. 261). Springer Nature. • Leal Filho, W., Mifsud, M., & Pace, P. (Eds.). (2018). Handbook of lifelong learning for sustainable development. Springer International Publishing. • Lozano, R., & Barreiro-Gen, M. (Eds.). (2021). Developing Sustainability Competences Through Pedagogical Approaches: Experiences from International Case Studies. Springer Nature. • Reimers, F. M. (2021). Education and climate change: The role of universities (p. 201). Springer Nature. • Vare, P. E., Lausset, N. E., & Rieckmann, M. E. (2022). Competences in Education for Sustainable Development. Springer International Publishing.

- Vasconcelos, C., & Calheiros, C. S. (2022). Enhancing environmental education through nature-based solutions. Cham: Springer International Publishing.

Complementary literature:

- Albert, C., Brillinger, M., Guerrero, P., Gottwald, S., Henze, J., Schmidt, S., ... & Schröter, B. (2021). Planning nature-based solutions: Principles, steps, and insights. *Ambio*, 50, 1446-1461.
- Ariza, M. R., Boeve-de Pauw, J., Olsson, D., Van Petegem, P., Parra, G., & Gericke, N. (2021). Promoting Environmental Citizenship in Education: The Potential of the Sustainability Consciousness Questionnaire to Measure Impact of Interventions. *Sustainability*, 13(20), 11420. <https://doi.org/10.3390/su132011420>
- Ariza, M. R., Christodoulou, A., Harskamp, M. V., Knippels, M. C. P., Kyza, E. A., Levinson, R., & Agesilaou, A. (2021). Socio-Scientific Inquiry-Based Learning as a Means toward Environmental Citizenship. *Sustainability*, 13(20), 11509.; <https://doi.org/10.3390/su132011509>
- Ariza, M.R., Quesada Armenteros, A., & Estepa Castro, A. (2021). Promoting critical thinking through mathematics and science teacher education: the case of argumentation and graphs interpretation about climate change. *European Journal of Teacher Education*, 1-19 <https://doi.org/10.1080/02619768.2021.1961736>
- Činčera, J., Romero-Ariza, M., Zabic, M., Kalaitzidaki, M., & del Consuelo Díez Bedmar, M. (2020). Environmental citizenship in primary formal education. In *Conceptualizing Environmental Citizenship for 21st Century Education*, (pp. 163-177). Springer.
- Encarnação J, Teodósio MA and Morais P (2021) Citizen Science and Biological Invasions: A Review. *Front. Environ. Sci.* 8:602980. doi: 10.3389/fenvs.2020.602980
- Gericke, N., Huang, L., Knippels, M. C., Christodoulou, A., Van Dam, F., & Gasparovic, S. (2020). Environmental citizenship in secondary formal education: The importance of curriculum and subject teachers. In *Conceptualizing environmental citizenship for 21st century education*, (pp. 193-212). Springer.
- Hadjichambis, A. C., & Paraskeva-Hadjichambi, D. (2020). Education for environmental citizenship: The pedagogical approach. In *Conceptualizing environmental citizenship for 21st century education*, (pp. 237-261). Springer.
- Hadjichambis, A. C., & Reis, P. (2020). Introduction to the conceptualisation of environmental citizenship for twenty-first-century education. *Conceptualizing environmental citizenship for 21st century education*, (pp. 1-14). Springer.
- Hennessey, M. G., & Soto, J. P. R. Convergencias ciudadanas para la acción climática y la biodiversidad.
- IPBES. Informe de análisis inicial sobre una evaluación de las causas subyacentes de la pérdida de la diversidad biológica y los factores determinantes del cambio transformador (evaluación temática) para lograr la Visión 2050 para la Diversidad Biológica.
- Palomo, I., Locatelli, B., Otero, I., Colloff, M., Crouzat, E., Cuni-Sanchez, A., ... & Lavorel, S. (2021). Assessing nature-based solutions for transformative change. *One earth*, 4(5), 730-741.
- Sarid, A., & Goldman, D. (2021). A value-based framework connecting environmental citizenship and change agents for sustainability—Implications for education for environmental citizenship. *Sustainability*, 13(8), 4338.
- Sass, W., Boeve-de Pauw, J., Maeyer, S. D., & Petegem, P. V. (2021). Development and validation of an instrument for measuring action competence in sustainable development within early adolescents: the action

	<p>competence in sustainable development questionnaire (ACiSD-Q). <i>Environmental Education Research</i>, 27(9), 1284-1304.</p> <ul style="list-style-type: none">• Sass, W., Boeve-de Pauw, J., Olsson, D., Gericke, N., De Maeyer, S., & Van Petegem, P. (2020). Redefining action competence: The case of sustainable development. <i>The Journal of Environmental Education</i>, 51(4), 292-305.• Vasiliades, M. A., Hadjichambis, A. C., Paraskeva-Hadjichambi, D., Adamou, A., & Georgiou, Y. (2021). A systematic literature review on the participation aspects of environmental and nature-based citizen science initiatives. <i>Sustainability</i>, 13(13), 7457.
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