



Course unit English denomination	Emerging issues of Digital Earth for Climate Resilient Development
Teacher in charge (if defined)	Massimo De Marchi (2ECTS) Salvatore Pappalardo (2ECTS)
Teaching Hours	24
Number of ECTS credits allocated	4
Course period	June-July 2026
Course delivery method	<input type="checkbox"/> In presence <input checked="" type="checkbox"/> Remotely <input type="checkbox"/> Blended
Language of instruction	English
Mandatory attendance	<input checked="" type="checkbox"/> Yes (70 % minimum of presence) <input type="checkbox"/> No
Course unit contents	<ul style="list-style-type: none">- Digital Earth and GIScience approaches in the Climate Resilient Development framework (phenomenology of global warming, intersectionality, theoretical debates, and practical implementations)- Interfaces between climate change and justice research- Geo Visualizing spatial and temporal scales of climate change, climate forcing, carbon budget, extreme weather events,- Alternative development pathways: phasing out of fossil fuels and “just transition”: from policies to land use management, going beyond cost-benefit analysis towards a participatory spatial multi-criteria decision-making process- Options for mitigations in the cities: mapping heat islands, soil sealing, green gentrification, urban green accessibility, urban riparian ecosystems and proximity agroecological farming to counter climate change.- Arenas of actor engagements: participatory mapping for citizen Science and climate awareness
Learning goals	<p>The IPCC Report of 2022 framed Climate Resilient Development (CRD) based on four pillars: reduced climate risks (adaptation); reduced greenhouse gas emissions (mitigation); increased biodiversity; achieving the Sustainable Development Goals.</p> <p>Participants will acquire theoretical and methodological knowledge to independently move within the debate on Climate Resilient Development by handling Digital Earth frameworks to geo-visualize complex policies and operations. The knowledge will be essential for managing the main drivers of the climate crisis: land use changes and emissions from fossil fuels.</p> <p>Focusing on emerging issues the course is offered to: acquire update knowledge on EU and international actions for CRD; to develop the ability, by adopting Digital Earth Approaches, to analyze ecosystem services, land use changes, just fossil fuel transition; to prepare researchers and professionals to the implementation of spatial complex operations for Climate Resilient Development; to use geo-visualization tool on public debate for Just Transition on CRD.</p>



Teaching methods	The course is based on a combination of seminars with experts and laboratories using Digital Earth, GIS and Remote in the challenges of Climate Resilient Development. The Moodle platform is available with the readings suitable for the specific topics and the laboratories.
Course on transversal, interdisciplinary, transdisciplinary skills	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Available for PhD students from other courses	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Prerequisites (not mandatory)	
Examination methods (in applicable)	The examination consists of three parts 1. Developing the GIS laboratories and uploading the assignments (30%) 2. Prepare a final assignment choosing among the preparation of a cartographic output or a written document or a video of 5 minutes about one of the topics of the course. Despite the choice any student should also prepare a Pitch of maximum 60 seconds (70%).
Suggested readings-	<ul style="list-style-type: none">- Special issue on "Climate justice in future cities: Geographical perspectives for inclusive urban resilience and adaptation" (Pappalardo S., Peroni F) in <i>Landscape and Urban Planning (2023 and 2024)</i> it contains 8 key articles on the topic- Codato D., Pappalardo S.E., Facchinelli F., Murmis M.R., Larrea C., De Marchi M. (2023), Where to leave fossil fuels underground? A multi-criteria analysis to identify unburnable carbon areas in the Ecuadorian Amazon region, <i>Environ. Res. Lett.</i> 18 014009- De Marchi M., Diantini A. Pappalardo S.E. (2022), Drones: Geographical Information Technologies; Agroecology; Organic Farming; Technological Sovereignty, CRC Press- Facchinelli F., Pappalardo S.E., Della Fera G., Crescini E., Codato D., Diantini A., Moncayo Jimenez D.R., Fajardo Mendoza P.E., Bignante E., De Marchi M. (2022), "Extreme citizens science for climate justice: linking pixel to people for mapping gas flaring in Amazon rainforest", <i>Environmental Research Letters</i>, 17- Leon-Sicard TE, Griffon, D., De Marchi, M., eds., <i>Agrobiodiversity, community participation and landscapes in agroecology</i>. Lausanne: Frontiers Media SA- <i>other readings will be suggested during the course and available on moodle platform</i>
Additional information	Before the beginning of the course a detailed programme will be available.