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Italiadomani
PIANO NAZIONALE
DI RIPRESA E RESILIENZA



UNIVERSITÀ
DEGLI STUDI
DI BRESCIA



UNIVERSITÀ
DI TRENTO

Course	Pygreen - Python tools for the green transition - Module on Environmental Water Resources Management
Organizing Institutions	Leading university: University of Trento Co-organizing Universities: UniTN/UNIMI/Polimi/UniUD University of Zambia Others: University of Namibia and University of Addis Ababa (TBC)
Target participants	Master students, Early/Middle Career Academicians (including phd's, post docs; also lectures, lecturers, researchers)
Objectives of the course	The Short School is aimed at providing a general overview of the Challenge of the Green Transition from a Sustainable Water resources management perspective and introducing instrumental tools to support the decision making process that can harmonize human development with nature and biodiversity conservation.
Strategic thematic area (select below*)	Sustainable Energy, environment and natural resource management.
Abstract (max 300 words)	Students will be equipped with enhanced understanding of the global challenges associated with the Green Transition with a specific focus on challenges related to an increased water resources exploitation, which is often associated with severe ecosystem degradation. As far as learning outcomes are concerned, students are expected to acquire a theoretical background on the response of freshwater ecosystems to anthropic stressors, with focus on water abstractions and flow regulation (e.g. dams, reservoirs, intakes). They will also be exposed to diverse set of open source software (python based) for increasing their instrumental skills in assessing the environmental effects of flow regulation and water abstractions and for designing smart water resources

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	management alternatives that can harmonize human development needs with nature and biodiversity conservation Specific references will be made to the African and European contexts. Lectures will be based on a mix of teaching techniques including sharing of experience, case studies, hands on, project works.
Period	January 2026
Place	Milano
Teaching delivery mode	In person
Language	English
Final test	Presentation and discussion of a Joint Project Work
How to apply	An expression of Interest will be send to the Partner University. A maximum of 10 attendants will be allowed
Contacts	international@unitn.it
Extended programme	Introduction to Environmental Water Management 4 hours _ Global uses of water and its environmental effects. Water abstractions and regulation of the river flow regimes. Water and development. Environmental water needs. Freshwater biodiversity losses and habitat degradation. Ecosystem services of freshwater systems. Perspectives from OECD economies, emerging economies and critical economies. Environmental water needs <u>E-flows</u> 8 hours _ Definition of Eflows. International and national regulatory frameworks. Types of methods to estimate e-flows: hydrological and eco-hydraulic metthods. Habitat modelling. Modelling examples by means of a python based in-house made model and integration of existing free softwares. Application to real case study using open-source code and group activity.

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	<u>Multi-temporal Earth observation for Freshwater Ecosystems</u> 8 hours The module provides an introduction to the principles and methodologies of multi-temporal satellite imagery analysis for the semi-automated extraction of spatially explicit information on rivers and floodplains, of the habitat mosaic they support (wet habitats, bare sediment surfaces, sparse and dense vegetation patches), of the active river corridor and of the evolution of these features through time. The module focuses on both online computational tools (e.g. the Google Earth Engine platform) and on in-house developed Python tools for 4 hours Freshwater ecosystems management: Basics of hydrological modelling of reservoirs and run of the river water intakes. Licensing water abstractions: main parameters (maximum, mean flow rate; ecological flows). Water abstraction scenario development. Optimal scenarios and the relation with sustainable human development for decision making. Project Work Execution base on PBL - 8 hours The course will be based on real-world case studies and follow a problem-solving approach. The course output will be a collaborative project between group of participants on selected case studies in water resources management
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* STRATEGIC THEMATIC AREAS

1. Rural development, land management, agrifood and food supply chains;
2. Health, water and hygiene, One Health;
3. Sustainable Energy, environment and natural resource management;
4. Entrepreneurial and industrial development for local prosperity;
5. Cultural heritage and sustainable tourism;
6. Social Sciences and humanities.

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