Title of BIP: Decentralized water and waste management systems: appropriate technologies and solutions for resilience and sustainability

2022-1-IT02-KA131-HED-000059401-2

This summer school integrates a short duration physical mobility component (5 days without counting travel days) with an online component (2 days), with a minimum of 3 ECTS.

General information
Objectives and Description: The course aims to explore appropriate technologies for water and waste management in rural and isolated areas in developing countries, providing participants with theoretical-practical knowledge for the decentralized management of these services. Decentralization appears as a logical solution to address the sustainability issues of water and waste management systems, as it focuses on on-site treatment and local recycling and reuse of resources. Furthermore, extreme weather and climate events pose significant risks to rural water systems. At this point, the vulnerability of the water sector to extreme weather and climate events in rural areas will be examined, and how systems support resilience will be explored. The course offers knowledge on decentralized technologies in water and waste management in rural and isolated areas, and their resilience and sustainability, with special focus on low-income countries. The course will offer participants: a) a series of tools to operate in rural and isolated contexts. b) ability to develop transversal skills that influence the decision and selection of the most appropriate technology; c) tools to increase the resilience of communities and improve the sustainability of water and waste management systems in rural and isolated areas.
Methods and outcomes: The BIP will consist of a total 48 working hours for students: 40 hours physical and 8 hours virtual activity. The following methodologies will be used during the course: challenge-based learning, participatory learning, cooperative learning, problem-based learning flipped classroom, work group and case study presentation. As a result, participants are expected to obtain: - an overview of decentralized technologies for water and waste management in rural and isolated areas, - theoretical-practical knowledge to choose the best decentralized technology for better resilience in these areas.
Field of Education: Civil Engineering, Land and Environmental Engineering, Sustainable city management, Architectural Engineering

Target audience / Participants profile:

The course is designed for undergraduate, master and Ph.D students and practitioners who have an interest in the study and management of appropriate technologies for water and waste management in isolated areas, with special focus on low-income countries. The target audience includes individuals from different fields:

- Practitioners in international development cooperation;
- Undergraduates, MSc and PhD students;
- Researchers, professors and other interested persons.

No of ECTS issued: 3 CFU

The course always integrates a short duration physical mobility component (5 days without counting travel days) with an online component (2 days), with a minimum of 3 ECTS. Students enrolled at University of Brescia in Civil Engineering, Land and Environmental Engineering or Architectural Engineering degree and participants in the BIP of the Partner Institutions can get n. 3 ECTS.

A certificate of attendance will be issued for students attending at least 75% of the course.

Language of instruction and requirements:

English (minimum level B2)

Dates for physical activity:

24.06.2024 – 28.06.2024

Location of physical activity:

University of Brescia - Department Civil, Environmental, Architectural Engineering and Mathematics (DICATAM), Via Branze 43, Brescia (Italy)

Dates for virtual component:

01.07.2024 – 02-07.2024

Virtual Component Description:

The virtual activities will be based on the analysis of decentralized systems for wastewater treatment and reuse in rural areas and water quality monitoring for water supply and wastewater in isolated communities in developed countries. Moreover, conventional and advanced technologies will be presented and an interactive discussion with participants about the topic will be guided.

Organizing Board

Receiving/Host university:

University of Brescia, Italy (Sabrina Sorlini, sabrina.sorlini@unibs.it)

Sending/Partner universities:

P1. University of Beira Interior, Portugal (Antonio Albuquerque, antonio.albuquerque@ubi.pt)

P2. University of Zaragoza, Spain (Rosa Mosteo Abad, mosteo@unizar.es)

P3. EAWAG – Sandec, Switzerland (Christoph Lüthi, Christoph.Luethi@eawag.ch)

Detailed programme

1. Planned activities during physical component:

1st day:

Monday 24th June

09:30 Participant registration and welcome

10:00 Presentation of the course - S. Sorlini

10:15 The role of appropriate technologies in water, sanitation and solid waste for resilience and sustainability

- Environmental aspects - S. Sorlini
- Health aspects – A. Matteelli
- Social aspects (TBC)
- Economic aspects (TBC)

12:00 Discussion and participant presentation

13:00 Lunch

14:00 Presentation of the PhD course - Curriculum "Appropriate Methodologies and Techniques in International Development Cooperation": opportunities for students and impact on projects - *M. Vaccari*

14:30 The experience of the PhD students

Technological Track

Disaster preparedness in drinking water supply - *M. Pezzato*

Revitalizing resources: valorisation of graphite from end-of-life Li-ion batteries through sustainable recovery - *D. Premathilake*

Health Track

Lifestyle assessment in rural and urban areas, Sub Saharan Africa: the value of Global Health - *G. Di Rosario*

15:30 - 18:00 Decentralized systems for wastewater treatment

- Sanitation Safety Plan for rural and isolated communities - *C. Luethi, S. Ubbiali*

2nd day:

Tuesday 25th June

09:00-13:00 Decentralized systems for wastewater treatment - *C. Luethi, S. Ubbiali*

- Technologies for wastewater treatment in rural and isolated communities
- Resource recovery in rural areas
- Resilience of WASH services

13:00 Lunch

14:00-17:00 Case studies / working group

17:30-19:00 Intercultural guided tour to the old town - *F. Martinelli*

3rd day:

Wednesday 26th June

09:00-13:00 Decentralized solid waste management (DSWM) - *M. Vaccari and other experts (TBC)*

- Technologies options for DSWM in rural and isolated communities
- The problem of burning garbage in rural areas
- Composting organic waste
- Resilience of DSWM services

13:00 Lunch

14:00-18:00

- Case studies / working group

4th day:

Thursday 27th June

09:00-13:00 Decentralized systems for drinking water management *S. Sorlini and other experts (TBC)*

- Management of environmental impacts and risks in decentralized water systems
- Technological solutions for the treatment of drinking water in rural and isolated areas
- WSP for rural and isolated communities
- WHO guidelines for small drinking water supply systems
- Resilience of water supply services

13:00 Lunch

14:00-18:00

- Case studies / working group

5th day:

Friday 28th June

09:00-11:00 Water quality control, based on physico-chemical and microbiological parameters, in sanitation systems and reuse of treated water - *R. Mosteo*

11:00-13:00 Sustainability and resilience of decentralized systems for water and sanitation - *A. Albuquerque*

13:00 Lunch

14:00-18:00

- Case studies / working group
- Visit to CeTAmb laboratory

2. Planned activities during virtual component (on-line):

6th day:

Monday 1st July (remote)

9:00-09:15 Introduction - *S. Sorlini*

09:15-11:15 Decentralized systems for wastewater treatment and reuse in rural areas - *A. Albuquerque*

- Technologies and solutions
- Nature-based solutions (NbS)

11:15-13:00 Water quality monitoring for water supply and wastewater in isolated communities in Brazil - *L. Carneiro*

7th day:

Tuesday 2nd July (remote)

90-11:30 Conventional and advanced oxidation processes for disinfection and organic compounds removal - *R. Mosteo*

11:30-13:00 Disussion and conclusion - *S. Sorlini, A. Albuquerque, R. Mosteo*

Application procedure

fill in application form available here: to be generated later

deadline:

Students send the applications to their home university.

Home university nominates the students at UNIBS by 31 May 2024.

Up to 5 participants per institution are welcome.

Facilities provided to participants:

- One meal/ day