

Presentation of the course

This course seeks to offer a wide range of information on already consolidated decentralized technologies in water and waste management in rural and isolated areas. 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.

The course will offer participants:

- Ability to develop transversal skills that influence the decision and selection of the most appropriate technology for rural and isolated context.
- Tools to increase the resilience of communities and improve the sustainability of water and waste management systems in rural and isolated areas.
- Theoretical-practical knowledge for the decentralized management of water and waste in rural areas.
- Group work on choice and development of appropriate technologies in selected contexts.

The course is relevant to:

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

Participation is free of charge but **registration** is required within the **31st of May 2024**.

This summer school is organized as an Erasmus BIP - Blended Intensive Programme. Students should apply for BIP funds at their home university if available.

If the registration through BIP program is not possible, students can still register without funding options.

In both cases, students are invited to fill out the registration form at this [link](#).

This course integrates a short duration physical mobility component (5 days without counting travel days, from 24th to 28th June) with an online component (2 days, 1st and 2nd July), with a minimum of 3 ECTS. Students enrolled at University of Brescia in Civil Engineering, Land and Environmental Engineering or Architectural Engineering degree courses can get n. 3 ECTS, if Summer School has been chosen in the study plan.

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

One meal per day will be provided to all the participants.

Scientific Committee

Sabrina Sorlini, Mentore Vaccari
Antonio Albuquerque, Rosa
Mosteo, Christoph Lüthi

Organizing secretariat

Maria Pezzato, Carmencita Tonelini
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CeTamb (<https://cetamb.unibs.it/>)

CeTamb is a research center of University of Brescia supported by Fondazione Cogeme, Museke, Sipek and Tovini. CeTamb aims to build knowledge and develop research on appropriate technical solutions for the management of environmental issues in Low and Middle Income Countries. CeTamb collaborates with NGOs, universities and secondary schools to carry out research and education activities. So far, several projects have been implemented and developed on water, sanitation and energy in different countries.

GETTING THERE

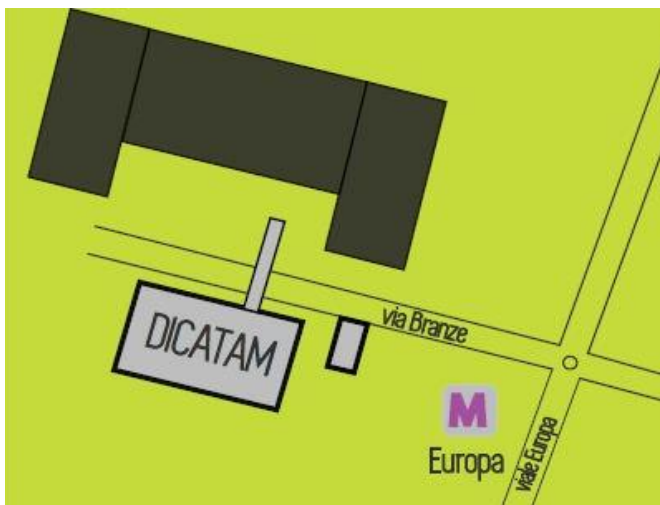
by car

Highway A4 Milano-Venezia

- from Milano, exit A4 at "Brescia Ovest" and follow indications to "stadio" (stadium) or "ospedale" (hospital) (North direction). Pass the hospital and turn right from via Triumplina to via Branze
- from Verona or Piacenza, exit A4 at "Brescia Centro" and follow indications to "stadio" or "ospedale".

by train

At Brescia station take the metro towards "Prealpino", stop at "Europa" then see the map below.



UNIVERSITY
OF BRESCIA

CeTamb
Research center 'Appropriate technologies for
environmental management in resource limited Countries'



Co-organized by



UNIVERSIDADE
BEIRA INTERIOR



Universidad
Zaragoza

eawag
aquatic research

Sandec
Sanitation, Water and
Solid Waste for Development

XIII International Summer School Blended Intensive Programme (BIP)

**Decentralized water and waste
management systems:
appropriate technologies and
solutions for resilience and
sustainability**

**Rural and isolated communities
in developing countries**

Coordinator

Sabrina Sorlini

24th June - 2nd July 2024

University of Brescia - DICATAM

Via Branze 43, Brescia (Italy)

Room B.05

Participation:

in person (24-28 June)

remote mode (1-2 July)

In collaboration with:



Cooperazione
& Volontariato
Fondazione G. Tovini - ETS

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

Rural and isolated communities in developing countries

Monday 24th June

Morning session (hybrid)

09:30 Participant registration and welcome

10:00 Presentation of the Summer School/BIP - *S. Sorlini*

10:20 The role of appropriate technologies in water, sanitation and solid waste for resilience and sustainability

- Environmental aspects - *S. Sorlini, A. Masoud*
- Cultural and social aspects - *L. Volpi*

11:00 Presentation of the **PhD course** - Curriculum "Appropriate Methodologies and Techniques in International Development Cooperation": opportunities for students and impact on projects
M. Vaccari

11:15 The experience of the PhD students

Technological Track

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

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

Towards Digital WASH Solutions for Sustainable Development - *M. Elkhider*

Health Track

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

12:15 Presentation of participants and discussion

12:30 Health aspects - *A. Matteelli*

13:00 Lunch

Afternoon Session (hybrid)

14:00 - 17:00 Decentralized systems for WASTEWATER treatment - part 1
C. Lüthi, S. Ubbiali

- Intro Sandec, Module overview, sanitation system intro
- How to use the Compendium, drawing tool, mini exercise
- Group work intro, students work in group

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

Tuesday 25th June

09:00-13:00 Decentralized systems for WASTEWATER treatment - part 2
C. Lüthi, S. Ubbiali (hybrid)

- Presentation of group work
- WASH in humanitarian contexts
- Emergency compendium, introduction to saniChoice & exercise

13:00 Lunch

14:00-17:00 Decentralized systems for WASTEWATER treatment - part 3
(in person)

Group work using SaniChoice & Groups present their findings

Wednesday 26th June

09:00-13:00 Decentralized SOLID WASTE management (DSWM) - part 1

T. Tudor, M. Vaccari (hybrid)

- 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 Decentralized SOLID WASTE management (DSWM) - part 2
(in person)

- Case studies / working group

Thursday 27th June (hybrid)

09:00-09:30 How to make technologies financially sustainable
D. Castellani

09:30-13:00 Decentralized systems for DRINKING WATER management part 1

Technological solutions for drinking water treatment in rural and isolated areas - *S. Sorlini*

Water quality monitoring in decentralized systems: case studies

L. Carneiro, C. Tonelini

13:00 Lunch

14:00-18:00 Decentralized systems for DRINKING WATER management – part 2
(in person)

- Case studies and group work - *M. Domini*

Friday 28th June

09:00-11:00 Water QUALITY CONTROL, based on physical-chemical and microbiological control parameters, sanitation systems and reuse of treated water - *R. Mosteo (hybrid)*

11:00-13:00 SUSTAINABILITY and RESILIENCE of decentralized systems for water and sanitation - *A. Albuquerque (hybrid)*

13:00 Lunch

14:00-16:00 (hybrid)

Case studies / working group - *R. Mosteo, A. Albuquerque*

16:00-18:00 (in person)

Visit to CeTAmb laboratory - *C. Tonelini, A. Masoud*

EXTRA ACTIVITIES

- Visit to CeTAmb laboratory of appropriate technologies, DICATAM Department *(in person)*
- Intercultural integration and guided tour to the old town center of Brescia *(in person)*

Monday 1st July (on-line)

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 Wastewater quality monitoring in isolated communities in Brazil - *L. Carneiro*

Tuesday 2nd July (on-line)

9:00-11:30 Conventional and advanced oxidation processes for disinfection and organic compounds removal - *R. Mosteo*

11:30-13:00 Discussion and conclusion

S. Sorlini, A. Albuquerque, R. Mosteo

Attendance Modes: *on-line, in person, hybrid*

SPEAKERS

Antonio Albuquerque	Universidade da Beira Interior (PT)
Davide Castellani	Università di Bergamo (IT)
Lilian Carneiro	Federal University of Goiás (BR)
Marta Domini	Università di Brescia (IT)
Christoph Lüthi	Sandec-EAWAG (CH)
Federica Martinelli	FAI (IT)
Ahmed M. Masoud	CeTAmb, Università di Brescia (IT)
Alberto Matteelli	Università di Brescia (IT)
Rosa Mosteo	Universidad Zaragoza (ES)
Sabrina Sorlini	CeTAmb, Università di Brescia (IT)
Carmencita Tonelini	Pontifical Catholic University of Goiás (BR)
Terry Tudor	BBSRC-UKRI (UK)
Sara Ubbiali	Sandec-EAWAG (CH)
Mentore Vaccari	CeTAmb, Università di Brescia (IT)
Laura Volpi	Università di Milano (IT)

PhD Students

Gianluca Di Rosario	Università di Brescia (IT)
Mohamed Elkhider	CeTAmb, Università di Brescia (IT)
Maria Pezzato	CeTAmb, Università di Brescia (IT)
Dilshan Premathilake	CeTAmb, Università di Brescia (IT)