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## GENERAL INFORMATION

**Title:** Observing and learning from the past to protect our future: water

**Dates for physical activity:** 12-17 February 2024

**Proposed period for virtual component:** 8<sup>th</sup> January 2024-12<sup>th</sup> February 2024

**Location of physical activity:** León (Spain)

**Type of Participants (Learners):** Students from Bachelor and Master, specially from Teaching in applied Science or engineering background, and students from Metrology Engineering and others Engineering Bachelors. Teachers interested in project base learning activities.

**ECTS issued:** 3 ECTS

**Field of Education<sup>①</sup>:** Teaching of Science and Environmental Protection. Applied Project base learning activity.

**Main Teaching/Training Languages:** English

**City of Venue:** León (Spain)

**Organizing board:** María Fernández Raga (mferr@unileon.es), Florian Theilmann (theilmann@ph-weingarten.de), thierry.villard" (thierry.villard@u-bordeaux.fr), Jose Luis Arenas Villarroel (joarenas@udec.cl)

**Host University:** University of León, Spain

**Partners:** University of León (Spain) University of Weingarten (Germany) and University of Bordeaux (France), Universidad de Concepción (Chile).

### Priorities Addressed:

- Inclusion and diversity
- Digital transformation
- Environment and fight against climate change
- Participation in democratic life
- Other

## PROGRAM

### Objectives and Short description<sup>②</sup>:

This project aims to design a project base learning activity to improve students' teamwork competences and communication skills while form them into the basic concepts of fluid mechanics. There will be a review the main advances in water management that have been made throughout history. We will explore the different water management systems used by outstanding cultures: Muslims, Romans, Greeks, Persians until nowadays. And how their ideas can be applied



today to contribute to a more efficient use of water that allows us to maintain our current standard of living but without risking the future of future generations.

**Methods and Outcomes<sup>®</sup>:**

**Methods and results :**

During the month of January, we will start with some online classes, done with videos shown through Moodle and synchronous meetings, where students are going to receive online classes. The main topics of this videos will be directed to improve their communication skills on English, also they will learn about how to present more effective, about project base learning techniques, and some basic fluid mechanics fundamentals that they should know to be able to understand different fluid mechanics applications. After that, we will conduct collaborative webquests for certain topics. In order to avoid the problem of the not coincidence of the period of exams in January for some students, we will record these classes and give open time to answer the activities.

This will be followed by a series of lectures to explain what project-based learning is and how it will be articulated. Subsequently, the students will be divided into groups, which should be formed by components of different countries from the 4 countries of the project (Spain, Germany, France and Chile).

Once this grouping into groups of 4 or 5 people is done, each group should choose a topic related to intelligent water management from the technical point of view. The main topics to select are shown here:

**a) More efficient landscape irrigation and agriculture:**

1. Design of gardens that are more responsible with water use.
2. Implementation of water saving systems to be implemented in existing gardens and orchards and measurement of water loss.
3. Measurement of water savings and optimization of this measure.

**b) Drinking water**

1. Efficient management of the drinking water network: Control of leaks and unaccounted for water.
2. Automation and robotics in the production of drinking water.
3. Alternative supply systems for rural populations.

**c) Sanitation**

1. Wastewater management and water reuse: applications of data science.



2. Caring for the environment: cogeneration and energy efficiency.

**d) Users / consumers**

1. New technologies applied to micro-measurement: IOT, AI and responsible water consumption.
2. Omnichannel in Customer Service.
3. Alternative approaches for measuring the impact of water on people's lives.

**e) Strategic Resource and Organization**

1. Water footprint and International Water Trade.
2. Novel interventions for Gender Equity in water sector.

**Physical mobility schedule (40 hours)** (the program could be updated):

Arrival on Sunday, February 11, in León.

**Monday, February 12, 2024 (8 hours):**

10:00 Inauguration, reception of participants.

10:30 a.m. Beginning of the course. Icebreaker activity.

11:00 Selection of the topic.

11:15 Brainstorming.

12:00 Coffee break.

12:30 Course on water saving in antiquity.

14:30: Lunch break.

16:00 Visit to the ancient city of León, looking at water management in the city.

19:30

**Tuesday, February 13, 2024 (8 h):**

10:00-11:30 Visit to the EREN Hydroelectric Power Plant (Paseo Papalaguinda, León).

11:30 Coffee break.

12:00 Bus to visit a wastewater treatment plant (Boñar, León).

14:30: Lunch break

16:00-19:00 Visit to Porma water reservoir. Water management in the Leonese mountains.

19:00 Return to León.



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**Wednesday, February 14, 2024 (8 h):**

09:00 Trip to Bierzo.

11:00 stop and visit to Herrería de Compludo (medieval smithy, forge).

14:30: Lunch time

16:00 Visit to Las Médulas - Water in the exploitation of the Gold Mine of Las Médulas, explanation by an expert.

19:00 Return to León.

**Thursday, February 15, 2024 (9 h):**

10:00- 14:00 Work in teams on their learning base project, University of León.

14:30: Lunch time.

16:00-20:00 Search for information, elaboration of presentations.

21:00 Dinner together León.

**Friday, February 16, 2024 (7 h):**

10:00-12:00 Rehearsal of presentations in teams.

12:00-14:30 Presentation of solutions before the tribunal, (University of León).

14:30: Lunch time

16:00-18:30 Awards ceremony.

**Virtual Component Description (20 hours):**

- Classes on effective presentations (4 hours).
- There will be a section explaining basic knowledge on fluid mechanics (4 hours). Some videos explaining the main concepts of fluid mechanics.
- There will be a series of guided exercises solving exercises with basic concepts, to see how these concepts are applied and will be asked to solve some exercises (6 hours).
- A second part will begin (10 hours) where different applications of water management in antiquity will be explained, with applied examples, and explaining the physical fundamentals that will be shown in the visits. Videos explaining these concepts will be shown.
- This second part will discuss the following topics:
  - History of fluid mechanics
  - Main concepts of fluid statistics:
  - All this information will be related to our visits to the reservoirs of the treatment plants and in the design of the Porma reservoir.



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- Design of a hydraulic installation and channels for fluid transport (Porma, treatment plant, Médulas mine, Herrería de Compludo).
- Turbines (Herrería de Compludo).

#### APPLICATION PROCEDURE

##### Requirements:

Good level of English (equivalent to a minimum B2 in accordance to the CEFR)

Profile: Bachelor/Master/Doctoral student/teacher of Engineering or teaching of Science.

Availability for both, virtual and presential mobility.

##### How to apply:

Each candidate must come with a short mobility (if they are students) or a training mobility (for teachers), financed by his/her institution.

If anyone is interested in joining, he/she must talk with his/her department of International Relations or Mobilities Erasmus from his/her institution to know if there is a possible Erasmus+ call for his/her financing in his/her university.

Once that he/she verify that he/she is eligible to ask for this mobility at his/her institution, she/he must write an email to the coordinator of the host university ([maria.raga@unileon.es](mailto:maria.raga@unileon.es)), with the topic " interest in joining the seminar "Observing and learning from the past to protect our future: water", and copying to His/her international office to let them know if they are admitted.

The coordinator of this BIP will write you back to both (candidate and institution) to tell you both if you are admitted.

Places are limited to 20 participants and will be filled in strict order of **registration**.  
**Last day for asking for joining is ,December 1, 2023.**

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<sup>①</sup> The ISCED-F 2013 (available at [https://drive.google.com/file/d/16kwJrsmhv-HKmuNYg1VptqJSQW\\_Ydex9/view?usp=sharing](https://drive.google.com/file/d/16kwJrsmhv-HKmuNYg1VptqJSQW_Ydex9/view?usp=sharing)) should be used to find the ISCED 2013 detailed field of education and training.

<sup>②</sup> **Objectives and description** of the Blended intensive programme (objectives, programme development, management/ coordination, organization, distribution of tasks among the partners, communication, local and international participation not funded by Erasmus+, etc.).

<sup>③</sup> **Description of the methodologies** used for learning and receiving training, the delivery of the programme (Teaching/ providing training), innovative elements, expected learning/training outcomes.