Integrated Study Project 2026

As part of the joint ERASMUS+ project “Nature-Based Solutions for Water Innovation, Sustainability, and Ecosystems (NBSWISE)”, three European universities organise a joint Integrated Study Project for students enrolled in Master’s and PhD programmes with focus on water resources management. The project consists of collaborative work on solving different tasks related to assessing the impact of nature-based solutions at river basin scale.

Location:
Brussels, study area: Maelbeek Valley

Date:
9-20 March 2026

Organiser:
Vrije Universiteit Brussel (VUB), Belgium, with contributions from University of Ljubljana (UL) and Technische Universität Dresden (TUD)

Contact person at TUD:
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Costs and logistic information:
Participation to the integrated project is free of charge for all the students (the costs will be supported by the joint project “NBSWISE” between VUB, UL and TUD). The costs for flights from Dresden to Brussels and accommodation in VUB guest house (double rooms) will be covered by TUD. Local transportation (case study visit) and other costs related to project implementation will be supported by VUB.

Objective:
The main objective of the “Integrated Study Project 2026” is to foster collaboration among students from partner universities in the implementation of an integrated study project. Through active group participation, the students are expected to acquire advanced technical expertise in understanding and model-based characterisation of processes ocurring at river basin scale in European temperate climate regions. The goal of the project is to increase the students’ understanding of the interactions between the different technical and non-technical relations in managing water resources on an integrated river basin scale.

Expected outcomes:
A report on the work implemented is required at the end of the event (one report per group), as well as a poster to be presented during the stakeholders’ conference on the last day of the project.

Credits:
The course will provide 5 ECTS credits (estimated workload: 150 hours). For students enrolled at TUD, there is a possibility to receive the 5 ECTS credits as equivalent to the Module MHSE36 “Internship Hydrosciences”, study course coordinator: Prof. Andreas Hartmann.

Programme:
The event will include a field trip (1/2 day) to the study area, presentations from VUB colleagues and invited experts, joint group exercises, a stakeholders conference (on 20 March), preparation of a final report and a poster.

Topics:
The work will be conducted in mixed groups of 3-5 students, addressing four interrelated topics. The TUD students (especially GroundwatCH) can focus on groundwater component (especially Topic 3 and 4), but participation in the other topics is also welcome. The formation of the groups and the allocation of topics per group will be done in Brussels at the beginning of the course.

Topic 1: Data-driven modelling of CSO occurrence

○ Objective/Focus: Making use of IoT data from the FLOWBRU monitoring network (flowbru.be) to develop a data-driven model (Machine Learning) for the Maelbeek catchment enabling to simulate CSO occurrence towards the Zenne River at the catchment outlet (Lion).

- FIELD WORK: Sensor exploration
- FLOWBRU data processing & analysis
- Explore ML modelling techniques
- Produce relevant "input" time series
- Develop and run data-driven/ML model to simulate CSO occurrence

○ Targeted final output: Machine Learning model that can simulate CSO occurrence

○ Recommended prior knowledge/Needed skills:

- Familiarity with hydrological data timeseries
- Data processing & analysis skills
- Basic (hydrological) modelling skills
- Programming

Topic 2: Water quality, WWTP and CSO Impact Senne

o Objective/Focus: Evaluate the water quality of the Zenne for dry (no CSO – only dry weather treatment conditions at WWTP) and wet weather conditions (CSO + wet weather treatment conditions at WWTP). Evaluate the potential impact of CSO on the water quality.

o Targeted final output: in-depth description/presentation of the Zenne River water quality (dry/wet, seasonality) and the distinctive role/impact of CSO and WWTP treatment

o Recommended prior knowledge/Needed skills:

- Familiarity with water quality data
- (Hydrological) data timeseries processing skills

Topic 3: Flood origin analysis

○ Objective/Focus: Flood occurrence and impact analysis in the Rue Gray (flooded 4 times during the Summer of 2024). In CoCreation with Citizens 'flood observation reports' have been collected > can be used for local SWMM model validation and identification of flood origin (sewer, runoff, groundwater) and outlook to potential solutions.

- Analysis of citizen flood observations

- FLOWBRU data analysis
- Develop a local SWMM model
- Identify hydrological fluxes and dynamics

○ Targeted final output: Local scale SWMM/Groundwater model that enables to "explain" the flood occurrence observations (presentation/report).

○ Recommended prior knowledge/Needed skills:

- Familiarity with hydrological data timeseries: processing & analysis
- Basic (hydrological) modelling skills (knowledge SWMM is a plus!)
- Groundwater modelling skills

Topic 4: Nature-based Solutions (NbS)

○ Objective/Focus: What IS or COULD BE the role of NbS in the Maelbeek Valley? Therefore, there is a need to first map existing NbS and assess the current impacts. Next potential zones for future NbS could be identified and evaluated (suitability analysis), followed by impact scenarios to assess the impacts and/or relevance.

POSSIBLE (SUB)ACTIVITIES:

- FIELD WORK
    - Mapping NbS : existing & planned
    - Infiltration tests
- Evaluate existing NbS : contributing runoff area? Runoff quality? (e.g. based on existing data on pollutants coming from roads, buildings, (reference values from WEISS as inspiration). D4RUNOFF project
- Identify priority zones for NbS implementation: e.g. flood-prone areas vs over-dimensioned paved surfaces (Check work done in Faireville project).
- Impact scenarios Nbs via simplified "model" approach. Use D4runoff parametric library? → provide info to topic 3.

○ Targeted final output: map with existing and potential NbS, including an assessment of the (potential) impacts (now and in the future), including on groundwater

○ Recommended prior knowledge/Needed skills:

- GIS/Spatial analysis skills
- Familiarity with NbS concepts
- Groundwater modeling