



**MARMARA UNIVERSITY
FACULTY OF ENGINEERING
ENVIRONMENTAL ENGINEERING DEPARTMENT**

**ENVE 4197/4198 ENGINEERING PROJECT
PROPOSAL FORM
FALL 2025-2026**

Instructor: Nur H. Orak

Project Title: Uncertainty Analysis for Green Infrastructure Scenarios in Urban Stormwater Management

Proposal No.: NurHOrak-1

Number of Students: (2 students)

Requirements (from students): Basic knowledge of statistics is recommended.

Scope of the Project:

This study aims to evaluate the performance of green infrastructure (GI) solutions, such as bioswales and constructed wetlands, in urban stormwater management under different parameter uncertainties. Using the Storm Water Management Model (SWMM), hydrological simulations will be conducted for selected rainfall events, and sensitivity analyses will be applied to examine how variations in key parameters (e.g., soil type, slope, vegetation, and design dimensions) influence runoff reduction and water quality outcomes. The results will provide insights into the reliability of GI performance predictions and highlight critical factors that need to be considered in the planning and design of sustainable urban drainage systems.

Hardware/Software/Lab/Equipment Requirements:

Hardware: A computer with internet connection
Software: R, EPA SWMM

Development Plan:

Students will improve their environmental engineering, analytical, and problem-solving skills by using the SWMM to simulate GI scenarios such as bioswales and constructed wetlands. They will apply sensitivity and uncertainty analysis techniques to assess how parameter variations affect stormwater runoff and water quality outcomes. This project will also strengthen their understanding of sustainable urban drainage systems and their role in climate adaptation.

Each student must prepare a research proposal outlining their objectives and methods, submit periodic progress reports to their advisor, and present their interim findings by the end of semester.



At the end of the project, students will submit a comprehensive final report to the department, summarizing their methodology, results, and recommendations for urban water management planning.

1. Literature review and exploring published methods
2. Learning EPA SWMM
3. Scenario development
4. Comparison analysis
5. Final thesis writing

TÜBİTAK 2209 basvuru projesi: Shafadiva Kamalia, Sena Demirkan