**MARMARA UNIVERSITY**

**FACULTY OF ENGINEERING**

**ENVIRONMENTAL ENGINEERING DEPARTMENT**

**ENVE 4197/4198 ENGINEERING PROJECT**

**PROPOSAL FORM**

**FALL 2025-2026**

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| **Instructor :** Asst. Prof. Dr. Sevil Coşgun  **Project Title :** Impacts of Climate Change, Population Growth and Land Use on Reservoir Storage in Istanbul with Future Projections  **Proposal No. :** SCosgun  **Number of Students :** 1 or 2  **Requirements (from students) :** Retrieval and processing of climate, population, and land use data to estimate and model their current and future impacts on reservoir storage through regression analysis. |
| **Scope of the Project :** Climate change, urbanization, and population growth are major factors affecting the sustainability of water resources in metropolitan cities. In large cities like Istanbul, these factors interact in complex ways to influence the availability and storage of freshwater. Changes in temperature and precipitation patterns, combined with increasing impervious surfaces due to urban development, can significantly impact how water is retained, lost, or consumed. In this study, students will investigate how multiple environmental and socio-economic drivers, including climatic variables (temperature, precipitation, evapotranspiration), population growth and land use change, have influenced reservoir storage levels in Istanbul between 2015 and 2025. The analysis will include the integration of public datasets, statistical modeling, and data visualization using the R programming language. A key goal of the project is to identify long-term trends and potential risk scenarios for future water availability under ongoing climate change. |
| **Hardware/Software/Lab/Equipment Requirements :**  R for data retrieval, regression modeling and visualization  Microsoft word for writing thesis  Endnote for reference management |
| **Development Plan :**   1. Data retrieval and preprocessing for meteorological data, climate projections, population statistics, land use datasets, and external water input records 2. Building regression models to analyze the effects of land use, population growth, climate variables, and potential changes in urban water consumption behavior on water reservoir dynamics in Istanbul 3. Estimating future reservoir levels based on projected climate scenarios (e.g., CHELSA SSPs) and population growth 4. Data analysis and interpretation of results 5. Writing and finalizing the dissertation |