**MARMARA UNIVERSITY**

**FACULTY OF ENGINEERING**

**ENVIRONMENTAL ENGINEERING DEPARTMENT**

**ENVE 4197/4198 ENGINEERING PROJECT**

**PROPOSAL FORM**

**FALL 2025-2026**

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| **Instructor : Prof. Dr. Erkan Şahinkaya**  **Project Title :** Sustainable Biofilm-Based Approaches for Carbon and Nutrient Recovery from Wastewater  **Proposal No. : 1**  **Number of Students :** (Max 2 students)  **Requirements (from students) :**   Review recent literature on high-rate biofilm processes and understand their role in carbon and nutrient recovery.   Participate in setting up a laboratory reactor and become familiar with its operation.   Carry out experiments, analyze the results, and share findings through reports and presentations. |
| **Scope of the Project :**  Domestic wastewater contains high concentrations of organic matter and nutrients. Conventional treatment requires large amounts of electricity for oxidation, which makes it unsustainable. With newly developed wastewater treatment technologies, the focus is shifting toward recovering these valuable components and viewing wastewater not as waste, but as a resource.  The aim of this project is to use a high-rate moving bed biofilm process to recover both particulate and dissolved organic matter from domestic wastewater. The treated water will be suitable for irrigation, while the recovered organic matter will be concentrated and made available for conversion into energy. |
| **Hardware/Software/Lab/Equipment Requirements :**   **Reactor setup:** Moving Bed Biofilm Reactor (MBBR) system, including reactor tank and carriers.   **Feeding system:** Peristaltic or similar type pump for controlled influent feeding.   **Analytical equipment:** Facilities for COD, pH, alkalinity, nitrogen, phosphorus Suspended Solids (SS) and Volatile Suspended Solids (VSS) measurements. |
| **Development Plan :**   1. Literature Review & Project Preparation 2. Laboratory Setup 3. Experimental Phase 4. Data Analysis & Interpretation 5. Reporting & Presentation |