**MARMARA UNIVERSITY**

**FACULTY OF ENGINEERING**

**ENVIRONMENTAL ENGINEERING DEPARTMENT**

**ENVE 4197/4198 ENGINEERING PROJECT**

**PROPOSAL FORM**

**FALL 2025-2026**

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| **Instructor :** Assoc. Prof. Sedat YALÇINKAYA  **Project Title :** Thermal Hotspot Detection in Odayeri Landfill  **Proposal No. :**  **Number of Students :** (Max 2 students) 2  **Requirements (from students) :** Fundamental GIS knowledge, or registration to ENVE4094 GIS in Water Resources. |
| **Scope of the Project :**  Landfills are complex biological and chemical systems where the decomposition of organic waste often results in elevated temperatures due to microbial activity. Detecting thermal hotspots is critical because these zones can indicate biogas leakages.  This project aims to identify thermal hotspot zones at the Odayeri Landfill site in Istanbul, Türkiye, which is currently a closed landfill. The primary data source will be Land Surface Temperature (LST) derived from satellite-based thermal imagery (Landsat). By applying this approach, it will be possible to monitor landfill thermal behavior without the need for ground-based sensors, while also providing large-scale and time-series analyses of surface temperature dynamics.  One year of LST data for Odayeri Landfill will be analyzed, and areas exceeding the mean temperature by more than one standard deviation will be classified as thermal hotspots. This statistical approach ensures an objective identification of anomalous regions while revealing both spatial and temporal dynamics of temperature variations across the closed landfill area. Finally, identified hotspot zones will be mapped and visualized within a GIS environment. The outcomes will not only enhance understanding of post-closure landfill behavior but also serve as a valuable reference for environmental monitoring, long-term site management, and potential early warning indicators. The project aims to demonstrate the applicability of remote sensing–based methods as a practical tool for assessing closed landfill sites without requiring in-situ measurements. |
| **Hardware/Software/Lab/Equipment Requirements :**  Laptop or desktop with simple hardware and software installed.  ArcGIS software. |
| **Development Plan :**   |  |  | | --- | --- | | **Work Step** | **Schedule (weeks)** | | Literature review & software setup | 1-8 | | Data acquisition | 9-14 | | Data pre-processing & deriving LST map | 15-18 | | Determining hotspots | 19-22 | | Final assessment | 23-25 | | Report wring & Poster preparation | 25-28 | |