**MARMARA UNIVERSITY**

**FACULTY OF ENGINEERING**

**ENVIRONMENTAL ENGINEERING DEPARTMENT**

**ENVE 4197/4198 ENGINEERING PROJECT**

**PROPOSAL FORM**

**FALL 2022-2023**

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| **Instructor: Prof. Dr. Barış ÇALLI, Özlem KAPLAN (PhD Student)**  **Project Title:** ALLEVIATION OF AMMONIA INHIBITION BY VACCUM STRIPPING  **Proposal No.:** *BarişÇalli-1*  **Number of Students:** Max 2 students  **Requirements (from students):** Workingmin. 2 hrs/day and 3 days/week in laboratory (in Göztepe Campus) |
| **Scope of the Project:** The aim of this project is to develop a vacuum-based ammonia stripping process operated at mild temperature (35-70 oC) to alleviate the ammonia inhibition risk in anaerobic digestion of nitrogen rich organic waste.  The mild-temperature vacuum stripping will be applied in a chamber located on the internal recycling line of anaerobic digester (AD) to remove the dissolved CO2 and NH3 gases from the digestate. After vacuum application, the digestate free of NH3 will be recycled back to AD and there it will decrease the NH3 concentration. In this way, it is expected that the ammonia inhibition risk will be reduced, and a higher methane yield will be achieved. In addition to alleviation of ammonia inhibition, it is also supposed that side-stream vacuum stripping will result in methane enrichment of the biogas, as the vacuum stripped digestate will absorb CO2 from the headspace when recycled back to the digester. In this project, different vacuum striping parameters such as temperature, pH and hydraulic retention time will be tested to find the optimum conditions for stripping of NH3 from digestate on recirculation line. |
| **Hardware/Software/Lab/Equipment Requirements:** Spectrometer, Magnetic stirrer, Incubator, pH meter, Vacuum Pump, Manometer, HPLC (UV detector), GC-FID, GC-TCD. |
| **Development Plan:**   1. Operation of ADs by feeding with chicken manure to obtain digestate (effluent) 2. Optimization of vacuum-stripping parameters 3. Evaluation of the effectiveness of vacuum stripping on ammonia inhibition |