



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

**ENVE 4197/4198 ENGINEERING PROJECT
PROPOSAL FORM
FALL 2026-2027**

Instructor : Prof. Bilge Alpaslan Kocamemi

Project Title: A Novel Approach to the Nitrification Process: The Complete Ammonium Oxidation (COMAMMOX)

Proposal No. :

Number of Students : (Max 4 students) 2

Requirements (from students) :

Scope of the Project :

This study aims to enrich Comammox Nitrospira species in lab-scale reactors which is operating under low dissolved oxygen (DO) conditions.

Enrichment studies will be started in a lab-scale sequencing batch reactor by using seed materials to be taken from various locations. Two reactors will be started with the same seed. One of them will be operated under limited DO conditions and the other reactor called as blank will be operated under unlimited oxygen conditions.

The enrichment period will be followed by observing nitrification process performance by daily ammonium ($\text{NH}_4^+\text{-N}$), nitrite ($\text{NO}_2^-\text{-N}$) and nitrate ($\text{NO}_3^-\text{-N}$) measurements. In addition, bacterial population will be evaluated by quantitative real-time polymerase chain reaction (qPCR) measurements.

- Plexiglass reactor (2L)
- DO, pH probes, temperature transmitter (Hach, Multi parameter)
- Peristaltic pumps (Prodoz PRS-7)
- Magnetic stirrer (Heidolph MR Hei standart)
- Air pump (Risheng RS-200)
- Timers (Timer, Ledx)
- Dual injection (cation and anion) ion chromatograph (Schimadzu SIL-10AP)



Development Plan :

The thesis will be managed according to the work schedule below. At the end of this thesis, it is expected to have experience in such as literature searching, time management, thesis writing, teamwork, data analysis.

Work - Time Table

Work	Time period (month)
Enrichment Studies for Commamox Species	2-12
Kinetic analyses of Commamox species	6-12
Data analysis, thesis writing	8-12