Laboratory of Environmental Systems

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Department of Sustainable Agriculture

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The Environmental Systems Laboratory conducts scientific research related to the design, analysis, development and optimization of processes for the treatment and valorization of water, as well as wastewater and solid wastes stream.

The Laboratory covers both educational and research activities.

The **teaching activities** involve training undergraduate and postgraduate students on environmental chemistry focusing on waste/wastewater management and treatment, while the main research activities include the assessment of existing water/wastewater treatment technologies, as well as the development of effective new treatment technologies.

The laboratory focuses on the development of systems (biological and/or physicochemical) for the effective treatment and overall management of potable water and industrial/agro-industrial wastewaters and solid wastes.

Specifically, **research activities include:**

1) Design of integrated processes for potable water treatment

2) Treatment and valorization of agroindustrial wastewaters and agricultural biomass for the production of biofuels and energy, in the framework of a circular economy

3) Application of microalgae/cyanobacteria for the treatment of wastewaters followed by high value-added biochemical products recovery

4) Development of innovative systems for the treatment of wastewaters containing high concentrations of pollutants

5) Process modelling and optimization of the above-mentioned processes

Currently, at the laboratory are 4 doctoral candidates

1. **Patrinou Vasiliki** (2018- in progress),
2. **Kora Elianta** (2019- in progress),
3. **Stefania Patsialou** (2020- in progress),
4. **Stefania Giannoulia** (2021-in progress)]

and above 10 undergraduate students.

The Laboratory of Environmental Systems is equipped with apparatus for sampling and analysing waters, wastewaters and solid wastes for different physical, chemical and microbial parameters. The laboratory has several lab- and pilot-scale bioreactors, and their associated pumps, stirrers, gas flow meters, air compressors, etc., while the analytical instruments include: Inductively Coupled Plasma (ICP) optical emission spectrometry (Optima 8000ICP-OES, Perkin Elmer) instrument, ion exchange chromatography (Thermo Dionex ICS-5000DC, Thermo Fischer Scientific), spectrophotometers (VIS and double beam UV/VIS), Kjeldahl digester and distillation apparatus, centrifuges, equipment for COD and BOD analysis, pH-, EC- and O2-analyzers, ovens, glassware, etc.