ACADEMIC YEAR 2017-2018 --- Master of Science and Engineering
Major in sustainable management of pollution

Semester	*S1*
Teaching Unit	*Pollutant behavior in abiotic matrixes*
Course	*Behavior of organic pollutants in the environment*
Dates	*November, 6th - 10th*
Teaching hours	*12 to 30 (depending on availability of the lecturer)*

Prerequisites

General and Inorganic Chemistry, Soil Chemistry

Learning outcomes

Students will be able to:

i) understand the main chemical interactions between pollutants and components of contaminated matrixes (soil, sediment, water…) and related transformation processes;

ii) evaluate, analyze and, from a theoretical point of view, predict the behaviour of pollutants in soils and the main retention and depollution processes which are active in the soil-water system. In details, the students will be able to link the behaviour of xenobiotics in the soil-water system to the physical and chemical characteristics of both pollutant and soil/sediment under investigation, to report on specific themes related to the fate of pollutants into soil and water, and to approach scientific reports dealing with the evaluation and assessment of pollution phenomena in the soil and water environment.

Course description

1 – Adsorption & Desorption of pollutants by soil

In this lecture, the main adsorption sites of soil components will be evaluated in order to define their role in the retention capacity of chemicals.

2 – Degradation of pollutants in the soil-water system

In this lecture, the abiotic degradation processes are presented apart from the biotic ones. As far as the abiotic degradation in the soil/water system is concerned, the mechanism of hydrolysis, catalysis, and photolysis will be shown. As far as the biotic degradation is concerned, the soil conditions promoting the microbial activity in the bulk soil and at the rhizosphere will be considered for their ability to transform pollutants in soils. The main biological degradative mechanisms acting in soil (i.e. simple

transformation as hydrolysis, oxidation, reduction, and conjugation processes) will be considered along with the degradation trend over time.

Class type & teaching methods

Class type can combine lectures with tutorial classes, case studies in groups… Batches are quite small (around 15 students) so open discussion might be an option as well !

Individual and/or group projects

Small individual or group projects can be proposed to the students

Assessment

A specific assessment can be proposed in the frame of this teaching mobility but is not compulsory