Effluents and pollution

ECTS credits
4 credits

In brief

Course langage: English

Presentation

Prerequisites

1A Mechanics and Chemistry-GP Course

Learning objectives

The EU concerns the treatment of effluents and the modeling of their diffusion in the environment. It is strongly linked to the Monitoring EU (detection and measurement of pollution) and the Circular Economy EU (waste valorization). The objective of the EU is to have a broad overview of the techniques of treatment of effluents, and in particular of waste water, if possible with a view to their reuse on the one hand, as well as the methods of monitoring pollution in rivers.

In detail, the UE is organized around the following topics:

* Effluent treatment: (33 h)
Water treatment
Membranes
Phytotechnologies: soil and water
Site visit (STEP Marseille)

* Diffusion in the environment: (13 h)
Modeling the dispersion of pollutants in rivers
Transfer of radionuclides in rivers

Description of the programme

Effluents and pollution

After an introduction concerning water (resources, demands, quality and main pollutants), the classical water treatment process is presented. A particular focus will then be made on the following unit operations: decantation, coagulation - flocculation, filtration, and barometric membrane separations. The second part of the course presents, through a combination of lectures and exercises, the main characteristics of flows in rivers and canals, as well as various problems related to the erosion and stability properties of the solid particles (in particular sediments) that make up the bottom and the banks. These elements of theoretical modeling are the basis of the methods used in the numerical model of radionuclide transfer/dispersion in rivers, which is then presented in the form of a case study, the part related to sediment dynamics playing a predominant role for this type of pollutant, which is largely fixed on sediments smaller than about 50 microns.

Generic central skills and knowledge targeted in the discipline

- C1: Scientific and technical innovation
- Development of new, more economical and/or more efficient processes, based on a thorough knowledge of the basic principles
- C2: Control of complexity and systems
- Better management of the production/waste treatment chain in order to come as close as possible to the objectives of sustainable development and, if possible, to the recovery of effluents (e.g. in the case of a waste treatment plant).
effluent recovery (process linked to the circular economy).

How knowledge is tested

DS 1 : Effluent treatment Written exam 2h (50%)
CC 1 : TP GP Practical work (20%)
DS 2 : Modeling (rivers) Written exam 1h30 (30%)

Teaching team

- Guichardon
- N. Ibaseta
- F. Anselmet (ECM)
- Patrick Boyer (IRSN Cadarache)

Sustainable Development Goal



Clean water and sanitation



Life below water

Total des heures **48h**

CM	Master class	26h
TD	Directed work	16h
TP	Practical work	4h
PJ		2h

Useful info

Name responsible for EU

Lead Instructor
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