INSA INSTITUT NATIONAL DES SCIENCES APPLIQUÉES TOULOUSE

Liste d'éléments pédagogiques

Practical info

Location(s)

Toulouse

Water supply and waste water treatment

ECTS
5 crédits

Hourly volume

Introducing

Objectives

At the end of this module, the student will be able to:

1. Understand and be able to explain:

- Notions of resources, water uses, access to water, pollution of receiving environments
- Who are the water stakeholders
- The role of unit operations (OPU) and advanced technologies in the drinking water production and wastewater treatment sectors

2. Know how to find information on the quality of a water resource and be able to assess whether the water is drinkable based on legislation

3. Propose and size treatment lines for producing drinking water from fresh waters and for purification of domestic wastewater, that are adapted to the quality of the resource, respectful of human health and the receiving environments and economical in energy and resources or able to valorize resources. In particular, the student will be able
3.1 designing an appropriate treatment line for the production of drinking water from fresh water, sizing its major unit operations and computing its energy consumption
3.2 comparing several processes for wastewater and sludge treatment
3.3 sizing an activated sludge treatment plant for the removal of major pollutants and choosing a sludge drying technology
3.4 sizing a sludge methanisation equipment

Necessary prerequisites

Unit operations 3A and 4A (sedimentation, filtration, membranes) (I4PETF32), Reaction engineering 3A ICBE (I3BERR12), Metrology/environment/risks (I4PEQS11), Biochemical reaction engineering (I4PERB11)

Practical info

Location(s)

Toulouse

Rational use of energy

ECTS
5 crédits

Hourly volume
22h

Introducing

Objectives

At the end of this module, the student will have understood and be able to explain (main concepts):
*How to establish energy and exergy balances on energy production or energy consumption scenarios. Critical analysis of the obtained results.
*Identify dysfunctions in a system and to propose optimal solutions. To propose new scenarios considering energy aspects.
*How to establish a life cycle analysis on energy production processes and different energy use scenarios; to use a software (Umberto) and the appropriate databases. Use of results for process eco-design.
* Pinch analysis for improving energy use in a process.
*Other optimization methods (numerical methods) depending on the case study for process ecodesign.

The student will be able to:

*Mobilise knowledges in chemical engineering in order to solve complex problems in the field of matter and energy processing.
*Conception, design, modelling, conducting and optimizing (for technical and economical criteria) installations in the field of chemical engineering
* Considering safety, energy efficiency and management of environmental impacts in the early step of process design and in functioning of unit processes and processes.
*Conception of new unit processes and processes in different industrial fields like Ecoindustry, Energy, Environment, in order to reduce the climate change threat and contribute to energy transition.

Necessary prerequisites

Energetic thermodynamics
Process simulation and assessment
Processes and energy

Practical info

Location(s)

Toulouse