

### Liste d'éléments pédagogiques

## Practical info

Location(s)

**Q** Toulouse





#### Waste treatment and valorization

Hourly volume

63h

## Introducing

ECTS 5 crédits

waste (or gas effluent or wastewater)

- analyse and design processes the treatment or valorisation of solid wastes

#### Objectives

At the end of this module, the student will have understood and be able to explain:

- the legal and usual definitions of wastes in France.

- the strategies for waste treatment

- the principles of unit operations and processes commonly used in solid waste reduction, treatment or valorisation (chemical, biochemical or thermal processes).

The student will be able to:

- identify basic rules and policies for an environmental problem, and use it to define a technical problem or to propose an adapted solution

- quantify the dispersion of air pollutants from industrial sources

- determine the valorisation potential for an industrial waste (or gas effluent or wastewater)

- analyse and design processes the treatment or valorisation of solid wastes

#### The student will be able to:

- identify basic rules and policies for an environmental problem, and use it to define a technical problem or to propose an adapted solution

- quantify the dispersion of air pollutants from industrial sources

- determine the valorisation potential for an industrial

#### Necessary prerequisites

Good knowledge of the basis of chemical engineering

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# Advanced Separation processes for new water-uses, valorisation and new resources





## Introducing

#### Objectives

At the end of this module, the student will have understood and be able to explain (main concepts):

- to know the context of the new resources for water and compounds of interest (sea/brine waters, secondary effluent, food bio products )

- To know specific processes for water production (desalination, reuse, ultrapure water, water for industrial use ..)

- principle and design of sorption unit operations (ion exchange, preparative chromatography, adsorption)

- principle and design of advanced membrane separation operations (reverse osmosis, electromembrane processes)

- principle and design of unit operations based on a phase transition (precipitation, crystallization, *i*)

The student will be able to:

- to design processes for domestic wastewaters tertiary reuse

- to design desalination processes

- to design design processes for ultrapure water production or specific water for utilities

-to design processes for N , P and C recovery

- identify new resources

- conceive and design systems for these new resource use

- apply the knowledge to other case studies

#### Necessary prerequisites

Unit operation I4PETF31 Chemistry I1ANBC11 Energy and mass balance I3BEGP11 2AICBE Numerical Methods of resolution

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