

ENV-405

Water and wastewater treatment

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Cursus	Sem.	Type
Energy Management and Sustainability	MA1, MA3	Opt.
Environmental Sciences and Engineering	MA1, MA3	Opt.

Language of teaching	English
Credits	5
Session	Winter
Semester	Fall
Exam	Written
Workload	150h
Weeks	14
Hours	3 weekly
Courses	2 weekly
Exercises	1 weekly
Number of positions	

Summary

This course on water and wastewater treatment shows how to implement and design different methods and techniques to eliminate organic matter, nitrogen and phosphorus from wastewater, and how to apply physical and chemical methods and techniques to produce drinking water.

Content**Water quality**

Water resources, raw water composition, drinking water regulations

Principles of drinking water production

Physico-chemical processes, oxidation, disinfection, adsorption processes, membrane technologies, biological processes.

Process combinations for drinking water treatment

Evolution of treatment trains, standard process combinations, water re-use systems

Principles of organic and inorganic pollutants removal from wastewater

Primary, secondary and tertiary treatment, uncoupling the hydraulic and sludge residence time.

Activated sludge and immobilized biomass wastewater treatment plants

Operational principles and process diagrams, structure, biology, process configurations.

Elimination of nutrients

The microbial and chemical processes for the removal of nitrogen and phosphorus from wastewater.

Learning Prerequisites**Required courses**

Environmental chemistry; Microbiology for engineers; Process engineering; Sanitary engineering, water and waste management

Learning Outcomes

By the end of the course, the student must be able to:

- Interpret data on parameters of water and wastewater
- Verify the design of a classical wastewater treatment plant
- Optimize nutrient elimination in a wastewater treatment plant
- Propose a solution for wastewater treatment with the correct design
- Assess / Evaluate quantitatively unit processes for drinking water treatment
- Propose adequate process combinations for drinking water treatment
- Link raw water quality with drinking water treatment

Teaching methods

Lectures ex cathedra and exercises

Assessment methods

Two written mid-term exams during the semester (40 % of the final note) and one final written exam (180 min) during the winter session exam period (60 % of the final note).

Supervision

Office hours	Yes
Assistants	Yes

Resources**Moodle Link**

- <http://moodle.epfl.ch/course/view.php?id=3671>

Prerequisite for

Environmental bioprocess design