MASTER OF SCIENCE IN ENGINEERING

Module Description, available in: EN

Environmental Technologies: Wastewater Treatment

General Information

Number of ECTS Credits

3

Module code

TSM_WWTreat

Valid for academic year

2026-27

Last modification

2025-10-08

Coordinator of the module

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Explanations regarding the language definitions for each location:

- Instruction is given in the language specified for each location and module execution.
- Documentation is available in the language(s) listed for each location and module execution. If the documentation is in multiple languages, the percentage distributed is indicated (100% = all documentation provided).
- The examination, including both questions and answers, is provided entirely (100%) in the language(s) specified for each location and module execution. The exams are on-site.

	Lausanne			Lugano	Zurich		
Instruction					**X** E 100%		
Documentation					**X** E 100%		
Examination					**X** E 100%		

Module Category

TSM Technical scientific module

Lessons

2 lecture periods and 1 tutorial period per week

Entry level competences

Prerequisites, previous knowledge

Basics in chemistry and physics

Brief course description of module objectives and content

The student learns the mechanical, chemical and biological processes used for environmental engineering (wastewater treatment). The course covers chemical, physical and biological treatment technologies. Furthermore, the topic of water reuse (greywater) and nutrient recovery is lectured.

Aims, content, methods

Learning objectives and competencies to be acquired

Knowing the classical areas of environmental technology, namely the sustainable treatment of

- Wastewater and
- reuse and nutrient recovery from wastewater

Wastewater:

- Know different applied wastewater treatment technologies and be able to identify their pros and cons.;
- Insides of technological aspects of the different technologies;
- Knowledge acquisition on the adequate technology for different wastewater compositions;

Reuse and nutrient recycling

- Know the importance of nutrient recovery;
- Know the available technologies for nutrient recovery in wastewater treatment;
- Acquire know-how on water reuse and application with case studies

Module content with weighting of different components

- Introduction: (1/3) - 30%
    - Overview water management Switzerland/Global
    - Wastewater treatment essentials (WWTP visit)
    - Fundamentals of chemical, physical and biological wastewater treatment
- Water treatment (municipal and industrial) technologies (2/3) - 50%
    - Physical and chemical wastewater treatment technologies
    - Biological Nutrient Removal technologies
    - Technologies for the elimination of emerging contaminants (Micropollutants)
- Water recycling and nutrient recovery (3/3) - 20%
    - Water reuse (Greywater reuse, Drinking water)
    - Nutrient recovery (P, N)

Teaching and learning methods

Front lecturing (theory) with open discussion and classworks.

Literature

- Slides given at the course from the Lecturer;
- Tchobanoglous et al. (2003) Wastewater Engineering Treatment and Reuse, Metcalf & Eddy, McGraw Hill, 4th Edition.
- Stuez Richard (2009) Principles of Water and Wastewater Treatment Processes, IWA Publishing
- Jud Simon (2009) Process Science and Engineering for Water and Wastewater Treatment, IWA Publishing

Assessment

Additional performance assessment during the semester

The module contains additional performance assessment(s) during the semester. The achieved mark of the additional performance assessment(s) applies to both the regular and the resit exam.

Description of additional performance assessment during the semester

Throughout the semester, students will collaborate on designing a wastewater treatment plant. This project will culminate in a report, which contributes 20% to the final grade.

The evaluation will be based on three key criteria:

1. The quality of the final design and results.
2. The approach and process followed to achieve these results.
3. The effectiveness of teamwork and collaboration.

Basic principle for exams

As a rule, all standard final exams are conducted in written form. For resit exams, lecturers will communicate the exam format (written/oral) together with the exam schedule.

Standard final exam for a module and written resit exam

Kind of exam

Written exam

Duration of exam

120 minutes

Permissible aids

No aids permitted

Exception: In case of an electronic Moodle exam, adjustments to the permissible aids may occur. Lecturers will announce the final permissible aids prior to the exam session.

Special case: Resit exam as oral exam

Kind of exam

Oral exam

Duration of exam

30 minutes

Permissible aids

No aids permitted