

ME-602

Modelling, optimisation, design and analysis of integrated energy systems

Maréchal François

Cursus	Sem.	Type
Energy		Opt.

Language of teaching	English
Credits	2
Session	
Exam	Multiple
Workload	60h
Hours	28
Lecture	14
Practical work	14
Number of positions	

Frequency

Every year

Remark

Next time: Easter 2025 - EPFL Wallis

Summary

The student will learn advanced concepts in the field of process integration, process modeling and optimization for the design of integrated energy systems: Life cycle energy analysis.

Content

- Advanced process integration techniques based on mixed integer programming for site scale energy system integration.
- Integration of advanced energy conversion technologies including cogeneration, heat pumps and refrigeration systems in industrial processes and urban communities.
- Combined integration of heat and water for the design of integrated system.
- Process integration of batch and discontinuous processes.
- Definition of objective functions based on life cycle & energy analysis.
- Multi-objective optimization including energetic, environmental and economic parameters.
- Application to the design of integrated energy systems: zero emission plants, advanced cycles including combined cycles, thermal solar plants, hybrid solar combined cycles.

Note

EPFL-Wallis, room Mattemark I19.N3.20

Learning Prerequisites**Recommended courses**

Process integration (advanced energy systems), modeling and optimization of energy systems, thermodynamics, basic in optimization techniques

Assessment methods

Oral presentation and project report

Resources

Moodle Link

- <https://go.epfl.ch/ME-602>