

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
<b>Hours</b>	<b>28</b>
Courses	14
TP	14
<b>Number of positions</b>	

**Frequency**

Every year

**Remark**

Last time: from Tuesday April 7th to Friday April 10th, 2026 (week after Easter). Min. 6 participants for the course to take place

**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>