ME-602

# Modelling, optimisation, design and analysis of integrated energy systems

Maréchal François

| Cursus | Sem. | Type |
|---|---|---|
| Energy | | Obl. |

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|---|---|
| Language of teaching | English |
| Credits | 2 |
| Session | |
| Exam | Multiple |
| Workload | 60h |
| **Hours** | **28** |
| Courses | 14 |
| TP | 14 |
| **Number of positions** | |

## Frequency

Every year

## Remark

Next time : From Tuesday December 10th to Friday December 13th, 2019

## 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.

## 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