

COURSE: OPTIMAL DESIGN OF A LOCAL ENERGY NETWORK

Teaching Unit (for year 1):
“Smart and flexible energy management”

Face-to-face time
20 hours

Student workload
40 hours

ECTS
2

Responsible teacher



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Aims of the teaching

This course aims at introducing the fundamental concepts of how sizing and optimizing a local energy network : formulation of an inverse problem design (i.e. optimization problem), resolution of such problems.

Intended Learning outcomes (measured by the assessment)

At the end of the teaching module, the student should:

- Demonstrate knowledge on how to formulate the sizing of a local energy network into an optimization problem;
- Demonstrate ability to solve corresponding problems thanks to well-chosen optimization algorithms.

Learning activities and approach

| E-learning (online) | Lectures (onsite) 2h | Tutorials (onsite) 18h |
|---------------------|-------------------------|---------------------------|
| - | Lectures | Lab exercise |

Practical work equipment and location

Practice on computer, based on a microproject. Implementation and resolution of a complete problem using MATLAB (and its Global Optimization Toolbox).

Assessment method

Project outcomes 100%

Useful information

Prerequisites: Electrical circuit, power electronics, numerical analysis (optimization)

Related literature:

- Power Electronics in Renewable Energy Systems and Smart Grid: Technology and Applications by Bimal K. Bose (Wiley), 2019.
- Introduction to nonlinear and global optimization by E. M. T. Hendrix and B. G. Toth (Springer), New York, 2010.