2EL1310 – Renewable energies

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Department: DÉPARTEMENT SYSTÈMES D'ÉNERGIE ÉLECTRIQUE
Language of instruction: FRANCAIS
Campus: CAMPUS DE PARIS - SACLAY
Workload (HEE): 60
On-site hours (HPE): 35,00
Elective Category : Engineering Sciences
Advanced level : Yes

Description

This elective includes courses, tutorials and a project.
The objective of this course is to present the potentials of systems using renewable energy sources.
The first part is devoted to the main components for producing energy from renewable sources.
A second part concerns the integration and management of energy within the transport and the distribution systems. The conversion and storage
Project:

The title of the project:

Sizing of the electricity production facility using renewable energy sources on an agricultural farm

The pupils are divided into several groups. The project is presented at the start of the sequence. A defense is requested at the end of the sequence. Two 3-hour slots are provided to answer students' questionslements used in this framework will be discussed.

Quarter number

SG8

Prerequisites (in terms of CS courses)

Elective 1A "Electric energy" or equivalent

Syllabus

- Main sources of energy production from renewable sources

  Wind, Solar PV, Solar Thermal, Biomass, Rankin Cycle

- Integration and energy management

  Wind energy in electricity networks

  PV solar energy in electricity networks

- Hydrogen sector

  Production, storage, use

- Case of autonomous isolated networks.

  Modeling and sizing of elements. Management of power flows

Class components (lecture, labs, etc.)

L(1-4) // T--T2(5-6) // CM(7-12) // T3-T4(13-14) // CM(15-18) //project(19-22)//

Grading

The course evaluation method:
The evaluation will be done by a written exam and a project defense

For the written exam:
There is a written exam of 2 hours with the authorized documents

For the project :

Defense duration: 20 to 25 minutes
Questions: 10 to 15min
Deliverable: presentation support
The evaluation score:
75% for the written exam and 25% for the project.

Note :
The report is not requested for this project
Presentation in English is accepted

Resources

Teaching staff (names of lecturers): Amir Arzandé, Jean-Claude Vannier, Martin Hennebel and industrial speakers

Size of tutorial class (default 35 students): 18 (for a staff of 72 students)
Computer rooms for the project

Learning outcomes covered on the course

- Master the characteristics of the various components involved in the generation, conversion and management of energy from renewable sources
    - Understand the difficulties related to the integration of these means of production in the electrical networks
    - Solve simple sizing problems of energy supply systems from renewable sources.
    - Evaluate the economic aspects

Description of the skills acquired at the end of the course

C1.3 Apply problem-solving through approximation, simulation and experimentation.
C1.4 Design, detail and corroborate a whole or part of a complex system.
C3.7 Make pragmatic and informed choices with the aim of producing tangible results.