Other energies for tomorrow? The examples of biomass and hydrogen

ECTS credits
2 credits

In brief

Course langage: French

Presentation

Prerequisites

No particular prerequisites: the common core courses of the 1st and 2nd year are sufficient.

Learning objectives

Identify, understand and master the issues and challenges to be met in order to use technologies involving biomass and bioenergy, as well as hydrogen and fuel cells, for the general public. In both cases, these are potentially very interesting energy sources for the future, but their real development and impact are still quite uncertain, both in terms of scale and implementation over time.

Description of the programme

The course includes equal parts on bioenergy and on hydrogen and fuel cells. As far as bioenergy is concerned, an introductory session of the course allows to position the problem and the stakes. The other sessions are centered on case studies and supervised personal work on specific points related to biofuels (global analysis of the process, pretreatments, distillation processes, associated energy balances...). For the part on hydrogen and fuel cells, the course sessions combine lectures and exercises/tutorial work. In particular, the underlying thermodynamic aspects related to redox reactions will be presented, which allow a good understanding of the functioning of fuel cells and the technological issues involved in their optimization. The aspects related to safety and the standardizations under development for these systems will also be presented, as well as examples of existing installations and devices both in the transportation field and for stationary applications.

Centrale Méditerranée

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Generic central skills and knowledge targeted in the discipline

C1: Central engineers create value through scientific and technical innovation.
C2: Central engineers master the complexity of the systems and problems they encounter.
C3: Central engineers manage programs.
C4: Central campus engineers manage in an ethical and responsible manner.

How knowledge is tested

DS (50 %)
CC (50 %)

Bibliography

A.V. da Rosa, Fundamentals of Renewable Energy Processes, Academic Press, 2012
M. Boudellal, La pile à combustible, L'hydrogène et ses applications, Dunod, 2012

Teaching team

- F.Anselmet
- P. Denis

Sustainable Development Goal



Affordable and clean energy



Building Resilient Infrastructure



Sustainable cities and communities



Responsible consumption and production

Total des heures		**30h**
CM	Master class	18h
TD	Directed work	12h

Useful info

Name responsible for EU

Lead Instructor

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