PEES9AE MODELLING OPTIMIZATION ENERGY SYSTEMS

PEES9AE **Modelling and optimisation of energy systems**	**Duration :** **21 hours**	**ECTS Credits : 2**	**Semester : S9**

Person(s) in charge :

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Keywords : Modelling, Optimizing, Energy converters

Prerequisites : Thermodynamics

Objective:

Programm:

This course deals with the presentation, modelling and optimization of the principal energy converters. The aim is to present the general principles of each energy system, to thermodynamically analyze the way they work, leading especially to their design principle and technology. The course is based on software applications like Thermoptim, which can quickly implement the principles seen in class and test the effect of the system's parameters on its responses.

Content:

- Technical presentation of the principal energy converters: diesel and gasoline motors, gas turbines, cogeneration, cooling machines, heat pumps, air conditioning.
- Revision of the theoretical and real cycles of converters.
- Carnot cycle, Joule, Beau de Rochas, Diesel, Hirn, Rankine.
- Modeling and optimization in terms of energy engineering. Implementation of software like THERMOPTIM.

Abilities :

Levels	Description and operational verbs
Know	Know the most common thermodynamic cycles of energy converters and the energy optimisation techniques
Understand	The products of a combustion, how a flame spreads, coupled transfer phenomena in presence of a chemical reaction
Apply	Cycles of : gas turbines, internal combustion engines. Combined cycles, co-generation, Hirn cycle, Rankine
Analyse	Analyse the energy efficiency of energy converting systems
Summarise	Calculate and design energy converting systems
Assess	

Evaluation :

☑ Written test	☑ Continuous Control	☐ Oral Report	☐ Project	☑ Written report