ELEC2670 Electromechanical converters : Advanced topics

[30h+15h exercises] 4 credits

This course is taught in the 2nd semester

Teacher(s):	Bruno Dehez, Francis Labrique (coord.), Ernest Matagne
Language:	French
Level:	Second cycle

Aims

This course is oriented towards the electric power conversions used in the field of the renewable and durable energy sources. One of its goals is to present an introduction to the literature specialised into the field.

Main themes

Identical to the contents of the course

Content and teaching methods

The studied modes of conversion can vary one year to the other
Preferred subjects the last years :
Photovoltaic conversion : silicon cells, connection of the elements in order to optimise the power obtained, storage of energy and food of various loads, tranformation into tension and tension and alternating current, examples of achievements...
Electromechanical conversion in association with wind power.
Other possibilities :
Thermoelectric conversion : laws of Kelvin, output of a thermocouple, figure of merit, electric and thermal conductivity, thermoelectric capacity, material selection and experimental determination of the macroscopic parameters.
Magnetohydrodynamic conversion : ionisation in gases, conductivity, Hall effect, general equations of magnetohydrodynamics, simplified equations, characteristic of converters, comparison between the various types.
This course leaves much freedom to the students in the choice of the tackled subjects. According to the covered subject and wishes of the students, part of the matter can be seen in the form of lecture, and another part in the form of seminar, each student the presenting to the group an article read in a specialised review. With regard to photovoltaic solar energy, one can also use the Internet site http://www.lei.ucl.ac.be/~matagne/SOLAIRE/INDEX.HTM

Other information (prerequisite, evaluation (assessment methods), course materials recommended readings, ...)

Prerequisites :
Only a basic knowledge of the physic of electricity is required.
Assessment :
The evaluation is individual and oral during the session, on the basis of reports issued by the students during the year (in groups).

Other credits in programs

ELEC22	Deuxième année du programme conduisant au grade d'ingénieur civil électricien	(4 credits)
ELEC23	Troisième année du programme conduisant au grade d'ingénieur civil électricien	(4 credits)
ELME22/E	Deuxième année du programme conduisant au grade d'ingénieur civil électro-mécanicien (énergie)	(4 credits)