



# Faculté des sciences appliquées

## FSA

### ELEC2311 PHYSICS OF ELECTROMECHANICAL CONVERTERS

[15h+22.5h exercises] 3 credits

This course is taught in the 1st semester

**Teacher(s):** Hervé Buyse, Ernest Matagne  
**Language:** french  
**Level:** 2nd cycle course

#### Aims

To analyse the internal physical behaviour of converters with electromagnetic coupling used for actuation or energy transformation, in order to allow the evaluation of their performances and the establishment of methods of designing of these devices. This analysis is based on the application of the laws of electromagnetism.

#### Main themes

- Methods taking into account certain physical characteristics in the form of global models (non-linear characteristic of magnetic materials, slipping circuits, calculation of parameters per homogenisation)
- Electromechanical conversion analysis into local terms (based on the determination of the fields and the force distributions)
- Introduction to the CAD software tools in electrical engineering
- Detailed attention to the coherence of the introduced concepts

#### Content and teaching methods

This course approaches the design of the converters with electromagnetic coupling. It describes the internal physics of these converters, its influence on their behaviour and the implications in terms of dimensioning and mode of use.

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

Prerequisites :

A basic knowledge of the electromechanical converters is required, like that acquired at the time of the course ELEC2310 or ELEC2753.

For more information, see <http://www.lei.ucl.ac.be/~matagne/ELEC2311/INDEX.HTM>.

Moreover the students can require weekly all the explanations they wish

Assessment :

Oral exam during the session, on the basis of reports issued by the students during the year (in groups)

#### Other credits in programs

<b>ELME22/E</b>	Deuxième année du programme conduisant au grade d'ingénieur civil électro-mécanicien (énergie)	(3 credits)	Mandatory
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