

IDENTIFICATION

Course code : E2CP4B5
ECTS : 2.5

DURATION

Lectures : 6
Tutorial classes : 10
Labs : 12
Total : 28

Project :
Personnal work :

ASSESSMENT

2 written exams (2h/2h) + 1 lab report

TEACHING MATERIALS

Course slides + tutorial booklets + lab work booklets available on Moodle

LANGUAGE

English

CONTACT

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UE : BATIMENT-ENERGIE

COURSE : Electrical Engineering

SCOPE OF THE COURSE

OBJECTIVES

The objective of this course is to learn how to size, model, and analyze magnetic circuits (applied to coils, electromagnets, and transformers) as well as electro-mechanical conversions (DC machines and AC machines).

COMPETENCE AND SKILLS

- To have general knowledge of electromechanical converters (rotating machines).
- To know the basic properties of the three types of motors : direct-current motor, alternating-current motor, and stepper motor.
- To be able to identify which electrical quantity (voltage U , current I , or frequency f) affects which mechanical quantity (torque T or rotational speed Ω).
- To understand the concepts of active and reactive power.

PROGRAM

1. Static power conversion

- Active and reactive power.
- Transformers.

2. Electromechanical power conversion : rotating machines

- Principles and overall structure of rotating electrical machines.
- Direct-current machines : structure and operation.
- Alternating-current machines :
 - Synchronous machines.
 - Asynchronous machines.
- Machine description concepts : electrical part, mechanical part, efficiency, torque, etc.

BIBLIOGRAPHY

REQUIREMENTS

Mathematics, general physics, electricity.