Principles and structures of electrical machines

Component
École Nationale Supérieure d'Électrotechnique d'Électronique d'Informatique d'Hydraulique et des Télécommunications

In brief

- **Ametys Code:** ELP15
- **Open to exchange students:** No

Presentation

Objectives

Explain the physical principles of electromechanical energy conversion.

- Identify and describe the main structures of electrical machines (stator, rotor, windings, magnetic circuits, etc.).

- Differentiate between types of machines according to their operating principles (DC, AC, synchronous, asynchronous).

- Qualitatively analyze the electromagnetic and mechanical behavior of a machine based on its equivalent circuit.

Description

This course presents the operating principles and basic structures of the main electrical machines used in modern industrial electromechanical and energy systems (DC machines, alternators, asynchronous motors, synchronous motors, etc.) and focuses on electromechanical energy conversion, machine modeling, and the underlying electromagnetic principles.

Pre-requisites

- The fundamental concepts of electricity and electromagnetism

- The basics of electrical circuit analysis

- Elementary mechanical principles