EE-490(c)

Lab in electrical energy systems

Hodder André

Cursus	Sem.	Type
Electrical and Electronical Engineering	MA1, MA3	Opt.

Language of teaching	English
Credits	4
Withdrawal	Unauthorized
Session	Winter
Semester	Fall
Exam	During the semester
Workload	120h
Weeks	14
Hours	**4 weekly**
Practical work	4 weekly
Number of positions	

Il n'est pas autorisé de se retirer de cette matière après le délai d'inscription.

Summary

This teaching lab provides the experimental experiences associated to courses of the Energy orientation of the MSc in Electrical Engineering. The experiments cover : real-time simulation, power electronics and control, electrical machine and drives, and dynamic coordination.

Content

1. Real-time simulation of electrical circuits (4)
   - Circuit simulation principles
   - Deployment of the nodal analysis into a simulation environment
   - Deployment of the nodal analysis into a real-time simulation environment

2. Power electronics and control (3)
   - Hardware-In-the-Loop simulation of a Renewable Energy System – Considerations on Control
   - DC-DC Buck Converter - Multichannel Interleaved Converter
   - Analysis of Harmonic Pollution in AC Drive

3. Electrical Machines and drives (6)
   - Induction Machine : Basic and advanced behavior
   - Synchronous generator : Basic and advanced behavior

4. Dynamic coordination (1)
   - Control of system with delay with a Smith predictor

Keywords

- Real-time simulation
- Electrical machines and drives
- Power electronics and control
- Smith Predictor and optimal control

Learning Prerequisites

Required courses

Courses of the EE-MSc « Energy » orientation

Learning Outcomes

By the end of the course, the student must be able to:

- Analyze
- Characterize
- Perform
- Exploit
- Manipulate
- Verify

Teaching methods

Practical works in groups

Expected student activities

Attend every teaching lab and participate actively.

Assessment methods

Obligatory continuous

Supervision

Assistants	Yes

Resources

Websites

- http://tplaime.epfl.ch