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