Regulation for all users of the lab

1. General conditions

- The lab is a closed environment. Only people who are “informed” about the hazards of the lab, are admitted to the lab. The lab personnel is not responsible for accidents that happen when they are not present.

- The lab is only accessible for “informed” persons. The lab doors should always be closed.

- An informed person is notified about the lab regulation and has confirmed this by signing in the lab book.

- Persons that not meet these requirements can only enter the lab under supervision of an “informed person”. They cannot perform lab tests.

- Students and teaching assistants can never work on measurement setups that are connected to the grid (“live or active parts”: under voltage/tension). They also cannot work on moving setups or constructions. When working on lab setups, these setups should be de-energised (without voltage/tension). General safety recommendations, as given in the “5 safe steps” should be taken into account.

- Only “skilled lab personnel” can make the connection between the grid supply and the safety switch that is mandatory at each lab setup. Until the next version of these regulation, following persons are considered “skilled lab personnel”:
  - Johan De Winter
  - Luc Willems (HS – EnergyVille)
  - Gert Verbeek (EnergyVille)

- A lab setup can only be energised after it is checked by “skilled personnel”. During student lab tests the supervising teaching assistants act as “skilled personnel” and they perform this check.

- The layout of a lab setup that is energised cannot be changed: i.e. only measurements can be performed.

- In case of long duration tests, the lab responsible is notified in advance. He/she will, if required, notify the HSE and surveillance services.

- During long duration tests that are performed by the same persons, and when no fundamental changes to the lab setup are applied, these persons are considered “skilled personnel” for their lab setup. The persons have to respect all applicable safety regulations.

- Persons under influence of alcohol, medication and others don’t have access to the lab. Skilled lab personnel or teaching assistants have the right to refuse those persons access to the lab.

- When chemical products, lasers and/or ionizing or micro waves are used during lab tests, a risk analysis has to be made. If this analysis indicates an increased risk for hazards, the HSE service has to be consulted.
2. Safety regulation during student lab tests

- Everybody has to respect the lab regulations
- The lab setup has to be de-energized during each modification to the measurement setup. The setup can only be energized after a check by the supervising teaching assistant. The lab emergency stop can only be operated when required, i.e. in exceptional circumstances (*). The emergency stop of the emergency stop module at the lab setup can always be operated. After this emergency stop, another module is connected. This module contains a RCD (residual current device), a safety switch and suitable (overload and short-circuit) protections.
- After the emergency stop module of the lab setup, another switch box is connected. This box contains a RCD of 30mA, a safety switch and suitable (overload and short-circuit) protections. Fixed or variable AC voltage is always branched from here. An analog voltage measurement can be connected as a voltage indication.
- The measurement setup is built using safety wires with 4mm plugs. In case of higher currents, other wires with cable shoes are applied. Very low safety voltages can be connected with 4mm plugs without safety plugs.
- Make sure that the terminal, in case of wires with cable shoes, is sufficiently fixed.
- Build up a measurement setup systematically. Start with the current loops. Afterwards connect the voltage measurements. Use different colors for each phase to avoid mistakes.
- Use suitable switches depending on the current that has to be switched. Switches for DC are different from switches for AC.
- Be careful with turning axes. They always have to be shielded. Make sure that long hairs, loose clothing or measurement wires cannot be carried away by the axis. Scarves and ties are not allowed in the lab.
- Metal parts have to be earthed. It is forbidden to decouple the earth connectors. Only in case of galvanic separation exceptions to this rule can be allowed.
- Make sure that lab setups and measurement equipment are not overloaded. Always check the name plate ratings of lab and measurement equipment before starting the measurements.
- At the end of each lab tests the voltage has to be controlled to zero if this does not happen automatically. A load has to be controlled to the minimum.
- According to art. 47 of the AREI the lab Electrical machines is a room where only persons with BA4 (“informed persons”) code are allowed. Each user of the lab has to learn and follow the lab regulations.
- EVERY STUDENT IS EXPECTED TO BE SUFFICIENTLY INFORMED TO KNOW THE HAZARDS ASSOCIATED WITH ELECTRICITY.

(*) Exceptional circumstances:
In case of an emergency situation: if the emergency stop of the lab setup is not within reach, the general lab emergency stop can be operated.
3. House rules during student lab sessions

- If the order of magnitude of the measurements is not known, the measurement device is put at its highest scale setting.
- Secondary windings of a current transformer can never be opened when a current flows through the primary winding.
- Make sure that the inrush currents of motors do not damage the measurement equipment. If necessary you should short circuit the current measurement or start at a reduced voltage.
- State in the report what measurement devices were used and where appropriate note down their characteristics. For student labs the lab number is sufficient.
- For registering measurement results one can work in two ways:
  - The measured value is read directly. E.g. this is the case if the voltage is measured with a digital voltmeter.
  - The measured value has to be multiplied with a scale constant. The following example illustrates the method:

<table>
<thead>
<tr>
<th>Measured value</th>
<th>Scale constant</th>
<th>Real value</th>
</tr>
</thead>
<tbody>
<tr>
<td>30W</td>
<td>1,5</td>
<td>45W</td>
</tr>
</tbody>
</table>

- Don’t take measurement equipment, connection wires or measurement wires from other measurement setups. Only use equipment that is provided at your measurement setup.
- Put all measurement devices close to each other on a table. Avoid putting devices between other setups or on chairs.
- Always place an idling diode or resistor parallel to the field winding of a DC machine.
- Fill in the name tag at the start of the lab session. At the end of the session this name tag is hand in together with the report. After each session there will be an individual assessment.
- No drinks or food in the lab.
- Bags, coats, … are put at the entrance of the lab. Don’t leave valuable objects there.
- Stop in time. Haste makes waste.
- All wires that you connected should be decoupled and the wires should be put back at the correct location.
- Put the chairs under the tables when leaving.
- Prepare the lab. This avoids losing time, mistakes and damage to the measurement setups.
- Know where the emergency stop of your lab setup is located.