# Courses in English

## Course Description

<table>
<thead>
<tr>
<th>Department</th>
<th>05 Building Services Engineering, Paper and Packaging Technology and Print and Media Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course title</td>
<td>Automation I</td>
</tr>
<tr>
<td>Hours per week (SWS)</td>
<td>4</td>
</tr>
<tr>
<td>Number of ECTS credits</td>
<td>5</td>
</tr>
</tbody>
</table>

**Course objective**

The student
- knows and understands the principles of measurement and control techniques and fundamental measurement and control elements and concepts, especially
- the mode of operation, the application, and the use of different sensors,
- the mode of operation, the application, and the use of control elements for linear and non-linear dynamic systems,
- the structure and application of programmable storage control systems, as well as comprehensive hierarchically constructed and decentralized automation systems, as well as their application in technical process equipment,
- can understand complex information and problems arising in the field of automation technology and work out solutions for the corresponding process,
- knows the important physical mechanisms in the paper production process, the construction and use of sensors and actuators for online measurement, as well as to control the machine direction profile and the cross-direction profile of those parameters which govern quality,
- knows and understands the construction and method of operation of automation systems, especially quality and process control systems.

**Prerequisites**

Knowledge of mathematics, physics and chemistry

**Recommended reading**


**Teaching methods**

Lectures, Exercises (individually and in group work), Practical work, Field trip

**Assessment methods**

Written Examination (100 %)

**Language of instruction**

English

**Name of lecturer**

Dr. Tobias Kleemann

**Email**

tak@ivo.org

**Link**


**Course content**

Increasing knowledge of the principles of mathematics – vector analysis, special differential equations, Laplace transformation, transfer functions,
- Sensors and correcting control elements, measurement and control elements,
- Feed-forward and feedback control systems,
- Design control elements for linear and nonlinear systems,
- Nyquist Method,
- Lyapunov stability criteria for linear and non-linear systems.
- Quality and process control systems,
- Machine-direction profile and cross-direction profile control,
- Batch and continual processes.

**Remarks**