Name of the subject: **Automation I.**	*NEPTUN code:* KMXAU1ABNE	**Weekly hours:** 4 2 lec+ 0 gs + 2 lab	**Credit:** 5 **Req:** Examination
Subject leader: **Dr. József Neszveda**	**docent**	**Prerequisites:** KEXDT1ABNE	

Description of the subject:

Description of basic concepts of automation. Open and closed loop control connection methods and comparison. LTI (Linear Time Invariant) basic block concept, type of block descriptions in operator and frequency domain, general equations. The most popular complex blocks. Process field transfer functions, typical process types. Closed loop control steady state behavior for setpoint holder and follower control. Concept of stability examination methods in frequency domain. Control quality examination methods and description. The PID controller structure and application. Compensation methods in time and frequency domain. The hybrid systems, the right choice of sample time. Programmable logic controller types, hardware buildup, and programming methods.

Laboratory:

The open-loop On-Off control programming experiments (Digital logic, Timers, Counters using Schneider Zelio Control Relay). Solving textural form simple and complex controlling tasks using the same Control Relazs. Simple and complex process blocks analysis in time and frequency domain using MATLAB. Control loop stability analysis, compensation and quality check.. Stability and quality examination using MATLAB SIMULINK, PT3 loop and P controller simulation and analysis. PID compensation design based on step response of process field. PID compensation design based on transfer functoin of process field.

Literature:

C. L. Albert, D. A. Coggan, „Fundamentals of Industrial Control" ISA 1996
Harold L. „Wade Basic and Advanced Regulatory Control" ISA 2004
Pedro Ponce, Arturo Molina Gutierrez, Luis M. Ibarra: Automation and control trends