Óbuda University Kandó Kálmán Faculty of Electrical Engineering	Department of Instrumentation ans Automation

Subject name and code: Control Systems KMWIR5ABNE Credits:3

Specializations: Electrical Engineering

Subject leader:	Varga, Árpád	Teachers:	Varga, Árpád

Prerequisites: none

Lectures:	**Theory: 2**	**Seminar.: 0**	**Lab. Exec.: 1**	**Consultations: 0**
demands :	Exam			

Education material

Aim of education: Students will become familiar with: The tools and procedures used in the design and execution of large-scale projects and the conceptual frameworks of key standards in this regard. How to describe batch technologies.
Students will learn: The software structure of process control equipment and how to apply control blocks. The state space description mode provides an introduction to generalized PID and non-PID control algorithms. Learn how to select and match state-of-the-art programmable transmitters and actuators.

Topics:	**Week:**	
Theory		
Physical and process model of batch technologies. Grouping of management procedures. Methods of validation concept.	**1.**	
Time-efficient matching of batch technology phases. Standard marking system. Sample task.	**2.**	
The concept of quasi-continuous PID control. Parameterize and improve control efficiency.	**3.**	
Control modules for process control machines. Design, parameterization, signal manipulation.	**4.**	
The state space description mode. Sample tasks	**5.**	
Principle of state space regulation. Principle of adaptive regulation.	**6.**	
SIL qualification methodology.	**7.**	
Principles, devices and instrumentation requirements for flow measurement.	**8.**	
Principles, tools and instrumentation requirements for quantitative measurement.	**9.**	
Principles, tools and instrumentation requirements for level measurement.	**10.**	
Principles, means and requirements of pressure.	**11.**	
Principles of temperature, devices, instrumentation requirements.	**12.**	
Principles for measuring other non-electrical quantities (pH, conductivity, etc.) I.	**13.**	
Principles for measuring other non-electrical quantities (pH, conductivity, etc.) II.	**14.**	
Laboratory		
Nonlinear systems	**1-2**	
Creating a nonlinear plant model in Matlab (pendulum, spill from tank)	**3-4**	
Creating a nonlinear plant model that can be run on a PLC in TIA Portal	**5-6**	
Creating a nonlinear PLC controller in TIA Portal	**7-8**	
Laboratory testwork: independent creation of nonlinear section and controller based on parameters specified in TA Portal	**9-10**	
Replacement, consultation		

Demand of the semester

Active participation in the lecture, completion of the laboratory indoors is at least sufficient.

Literature:

EC 881 Batch technology standard PCS7 manuals