Course Title:	Basics of Automation and Control
Institute/Division:	Department of Automation and Computer Engineering Faculty of Electrical and Computer Engineering
Course code:	E-BAS
Erasmus subject code:	0714 Electronics and automation
Number of contact hours:	45
Course duration:	1 semester (Fall/Winter)
ECTS credits:	6
Course description:	The course includes lectures, laboratory exercises and individual projects. The aim of the subject is to familiarize the student with the basic issues of automation applied in electrical engineering, related to basic regulation and control systems and the ability to design automation systems. • Basic definitions and issues. Classification of automation systems. Dynamic object and object of automatic control. • Object model; model features: linearity, stationarity, continuous time, discrete time. Examples. • Operator transfer function. Spectral transfer function. Time and frequency characteristics. Identification of parameters. • Two-position regulation. • Study of static characteristics of linear continuous control systems. • Study of frequency characteristics of linear continuous systems. • Continuous control system. Testing of Proportional Integral Derivative (PID) controllers. • Cascade speed control of DC motors • Study of the stability of a third-order linear system with a delay. The influence of the delay value on the stability - computer simulation • Static and astatic regulation. • Combinational and sequential logic circuits. Design of sequential automata. • Application of signal processing methods in modern regulation and control engineering Intended platform and software: hardware models of the above mentioned exercise topics, Matlab, Simulink. At-home practice: possible installation on a private computer of the Matlab with Simulink.
Course type:	Lectures (12h), Laboratory (24h), Project (9h)

Literature:	Ellis George, *Control System Design Guide*. Elsevier UK, 2016 Wang Liuping, *PID Control System Design and Automatic Tuning using MATLAB/Simulink*. Daniyan I. A., *Principles of Automation and Control*. Bentham Books 2023. Smith L.L., *Fundamentals of Industrial Controls and Automation*. Womack Educational Publications 1996.
Assessment method:	The final project, laboratory exercises
Prerequisites:	–
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