COURSE DESCRIPTION CARD – SPECIMEN

<table>
<tr><td colspan="10">Faculty of Faculty of Mechanical Engineering</td></tr>
<tr><td>Field of study</td><td colspan="6">Mechanics</td><td colspan="2">Degree level and programme type</td><td>Bachelor's degree/ Master's degree</td></tr>
<tr><td>Specialization/ diploma path</td><td colspan="6">Mechatronics, Automation and Robotics</td><td colspan="2">Study profile</td><td></td></tr>
<tr><td rowspan="2">Course name</td><td colspan="6" rowspan="2">Automatic control</td><td colspan="2">Course code</td><td>IS-MER0026W</td></tr>
<tr><td colspan="2">Course type</td><td>obligatory/elective</td></tr>
<tr><td rowspan="2">Forms and number of hours of tuition</td><td>L</td><td>C</td><td>LC</td><td>P</td><td>SW</td><td>FW</td><td>S</td><td>Semester</td><td>winter</td></tr>
<tr><td>30</td><td>15</td><td>15</td><td></td><td></td><td></td><td></td><td>No. of ECTS credits</td><td>5</td></tr>
<tr><td>Entry requirements</td><td colspan="9">Mathematics, physics, information technologies</td></tr>
<tr><td>Course objectives</td><td colspan="9">Introduction to automatics, modelling and operation of automatic control systems. Acquaintance with the modelling and design procedures of automation systems based on the analysis of existing solutions. The use of information technologies in design and control of robotic and automation systems. The use of Matlab simulation techniques for the design, analysis and evaluation of automation systems.</td></tr>
<tr><td>Course content</td><td colspan="9">Forward and inverse kinematics of Robots; transfer function; static and dynamic properties of automation systems; basic elements of automatic systems; mathematical description of automation and robotic systems; controllers PID; control systems stability; constructing automation systems based on pneumatic elements; simulation of automation systems in MATLAB program system environment.</td></tr>
<tr><td>Teaching methods</td><td colspan="9">Lectures, laboratory and/or project classes</td></tr>
<tr><td>Assessment method</td><td colspan="9">lecture – written exam, oral exam, tests; laboratory classes – evaluation of reports, verification of preparation for classes, tests;</td></tr>
<tr><td>Symbol of learning outcome</td><td colspan="8">Learning outcomes</td><td>Reference to the learning outcomes for the field of study</td></tr>
<tr><td>LO1</td><td colspan="8">defines the basic concepts of automatic control</td><td>K_W25, K_U01</td></tr>
<tr><td>LO2</td><td colspan="8">understands the essence of automation systems design</td><td>K_W25, K_U01</td></tr>
<tr><td>LO3</td><td colspan="8">analyses the existing technical solutions</td><td>K_W25, K_U01</td></tr>
<tr><td>LO4</td><td colspan="8">understands the problems of automatics</td><td>K_W25, K_U01</td></tr>
<tr><td>LO5</td><td colspan="8">uses advanced software functions to perform a task</td><td>K_W12, K_U15</td></tr>
<tr><td>LO6</td><td colspan="8">able to work in a team</td><td>K_U02</td></tr>
<tr><td>Symbol of learning</td><td colspan="8">Methods of assessing the learning outcomes</td><td>Type of tuition during which the outcome is</td></tr>
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outcome		assessed	
LO1	defines the basic concepts of automatic control	L, C	
LO2	understands the essence of automation systems design	L, C	
LO3	analyses the existing technical solutions	LC	
LO4	understands the problems of automatics	L	
LO5	uses advanced software functions to perform a task	LC	
LO6	able to work in a team	LC	
Student workload (in hours)		No. of hours	
Calculation	lecture attendance	30	
	participation in classes, laboratory classes, etc.	30	
	preparation for classes, laboratory classes, seminars, etc.	10	
	working on projects, reports, etc.	20	
	participation in student-teacher sessions related to the classes/seminar/project	10	
	implementation of project tasks	5	
	preparation for and participation in exams/tests	5	
	TOTAL:	110	
Quantitative indicators		HOURS	No. of ECTS credits
Student workload – activities that require direct teacher participation		61	
Student workload – practical activities		75	
Basic references	1. Shimon Y., Handbook of Automation, Springer, 2009. 2. Ogata K., Modern Control Engeneering, Prentice Hall, 2010 3. Matlab, www.mathworks.com/products/matlab/		
Supplementary references	1. Monkman G.J, Hesse S., Steinmann R., Schunk H.: Robot grippers. Wiley, 2007 2. Craig J.J.: Introduction to robotics : mechanics and control. Pearson Edu., 2004 3. Miatliuk K., Conceptual design of mechatronic systems. WPB, Bialystok, 2017.		
Organisational unit conducting the course	Department of Robotics and Mechatronics	Date of issuing the programme	
Author of the programme	Prof. Kanstantsin Miatluk	21.05.2021	

L – lecture, C – classes, LC – laboratory classes, P – project, SW – specialization workshop, FW - field work, S – seminar