

## COURSE DESCRIPTION CARD

Faculty of Mechanical Engineering									
Field of study	Automatic Control and Robotics Mechanics and Construction of Machinery Mechatronics Mechanics							Degree level and programme type	Bachelor's degree Master's degree
Specialization/ diploma path	general							Study profile	general
Course name	Fluid Drive Systems							Course code	IS-MER0038S
								Course type	obligatory
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	Semester	Summer
			30					No. of ECTS credits	5
Entry requirements	-								
Course objectives	Familiarizing students with the basic components of pneumatic and hydraulic drive systems: their functions, symbols, and nomenclature. Familiarizing students with the pneumatic and hydraulic symbols of the basic components of pneumatic and hydraulic systems. Familiarizing students with the basic principles of drawing pneumatic circuit diagrams. To acquire practical skills in the analysis, design, and assembly of simple and complex pneumatic drive and control systems.								
Course content	Introduction into pneumatic systems and hydraulic systems. The advantages of pneumatic and hydraulic systems. The production and transportation of compressed air –components that produce and transport compressed air. ISO symbols of pneumatics and hydraulics. Basic principles of drawing pneumatic circuit diagrams. Basic components of pneumatic and hydraulic drive and control systems –symbols, principles of operation. Fluid actuators: types, structure, selection rules, maintenance. Discharge valves: types, structure, principles of operation. Pressure and flow control valves. Design and assembly of complex pneumatic control systems. Examples of practical applications of pneumatic and hydraulic drive systems.								
Teaching methods	Design projects at the laboratory test stands.								
Assessment method	Laboratory classes – evaluation of reports								
Symbol of learning outcome	Learning outcomes							Reference to the learning outcomes for the field of study	
LO1	Student correctly identifies pneumatic and hydraulic symbols of basic components of pneumatic drive and							K_U03, K_U12	

	<b>control systems.</b>	
<b>L02</b>	<b>Student assemblies and tests basic pneumatic control systems.</b>	<b>K_U03, K_U12</b>
<b>L03</b>	<b>Student can draw pneumatic and hydraulic circuit diagram of automatic system.</b>	<b>K_U03, K_U12</b>
<b>L04</b>	<b>able to work in a team</b>	<b>K_K04</b>
<b>L05</b>		
<b>Symbol of learning outcome</b>	<b>Methods of assessing the learning outcomes</b>	<b>Type of tuition during which the outcome is assessed</b>
<b>L01</b>	<b>reports</b>	<b>LC</b>
<b>L02</b>	<b>reports</b>	<b>LC</b>
<b>L03</b>	<b>reports</b>	<b>LC</b>
<b>L04</b>	<b>observation of work during laboratory classes</b>	<b>LC</b>
<b>L05</b>		
<b>Student workload (in hours)</b>		<b>No. of hours</b>
<b>Calculation</b>	<b>participation laboratory classes</b>	<b>30</b>
	<b>preparation for laboratory classes</b>	<b>30</b>
	<b>working on reports</b>	<b>30</b>
	<b>participation in student-teacher sessions related to the classes</b>	<b>5</b>
	<b>TOTAL:</b>	<b>70</b>
<b>Quantitative indicators</b>		<b>HOURS</b>
<b>Student workload – activities that require direct teacher participation</b>		<b>35</b>
<b>Student workload – practical activities</b>		<b>65</b>
<b>Basic references</b>	<b>1. Beater P.: Pneumatic Drives: System Design, Modelling and Control, Springer-Verlag, 2007.</b> <b>2. Igor Lazar Krivts, German Vladimir Krejnin: Pneumatic actuating systems for automatic equipment structure and design, CRC Press, 2006.</b> <b>3. Pneumatic and hydraulic symbols: British and International Standards e.g. BS 2917, PN-ISO 1219-2 (2009), ISO 9461 (Hydraulics), CETOP, RP68P, ISO 5599 (Pneumatics)</b>	
<b>Supplementary references</b>	<b>Scientifics journals connected with pneumatic and hydraulic drive and control systems.</b>	
<b>Organisational unit conducting the course</b>	<b>Department of Automatic Control and Mechatronic Systems</b>	<b>Date of issuing the programme</b>
<b>Author of the programme</b>	<b>Tomasz Hućcio, Ph.D. Eng.</b>	<b>30.06.2020</b>

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

S – seminar