

## COURSE DESCRIPTION CARD

Faculty of Electrical Engineering										
Field of study	Electrical and Electronics Engineering							Degree level and programme type	bachelor's degree, full time programme	
Specialization/ diploma path	-							Study profile	-	
Course name	Programmable Logic Controllers							Course code	IS-FEE-10015W	
								Course type	elective	
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	Semester	winter	
	15		30					No. of ECTS credits	5	
Entry requirements	-									
Course objectives	This course will provide the basic technical skills and knowledge necessary to work with programmable logic controllers typically found in an industrial environment.									
Course content	Industrial control systems. Programmable Logic Controllers (PLC): classification, structure, selection, configuration. PLC programming languages. Input/Output devices (switches, sensors, relays, solenoids etc.). PLC communication with I/O devices. Sequential Control Structure. Industrial networks - Profibus and Profinet. Visualization of industrial processes - Supervisory Control and Data Acquisition (SCADA) Systems. Human-machine interface (HMI). PLC programming software. HMI software.									
Teaching methods	presentation and lecture, practical work, reports									
Assessment method	lecture – tests; laboratory classes – evaluation of reports									
Symbol of learning outcome	Learning outcomes								Reference to the learning outcomes for the field of study	
L01	explains the purpose of various components of industrial control systems									
L02	creates the control algorithm based on machine and process description									
L03	describes the basic structure and operation of the PLC									
L04	applies appropriate engineering tools for control application, visualization, configuration and parameterization selected PLC									
L05	writes PLC program and HMI program									
L06	executes and test the application on a set composed of PLC,									

	HMI and the process model		
L07	prepares the technical documentation and present the results		
Symbol of learning outcome	Methods of assessing the learning outcomes	Type of tuition during which the outcome is assessed	
L01	tests	L,LC	
L02	tests	L,LC	
L03	tests	L,LC	
L04	evaluation of reports	LC	
L05	evaluation of reports	LC	
L06	evaluation of reports	LC	
L07	evaluation of reports	LC	
Student workload (in hours)		No. of hours	
Calculation	lecture attendance	15	
	individual work on lecture topics	20	
	preparation for and participation in exams/tests	20	
	laboratory class attendance	30	
	preparation for laboratory class	20	
	work on reports	30	
	TOTAL:	130	
Quantitative indicators		HOURS	No. of ECTS credits
Student workload – activities that require direct teacher participation		45	1,5
Student workload – practical activities		95	3,5
Basic references	1. Kręglewska U., Ławryńczuk M., Marusak P.: Control laboratory exercises, Oficyna Wydawnicza PW, Warszawa 2007. 2. Erickson K. T.: Programmable Logic Controllers: An Emphasis on Design and Application, 2nd Ed, Dogwood Valley Press 2011. 3. Roebuck K.: SCADA: High-impact Strategies - What You Need to Know: Definitions, Adoptions, Impact, Benefits, Mat, 2011.		
Supplementary references	1. Clements-Jewery K., Jeffcoat W. : The PLC Workbook: programmable logic controllers made easy. London, Prentice-Hall, 1996. 2. Bolton W.: Programmable Logic Controllers (Fourth Edition). London, Elsevier, 2006.		
Organisational unit conducting the course	Department of Automatic Control and Electronics	Date of issuing the programme	
Author of the programme	Andrzej Ruszewski,, PhD Eng. DSc.	08.02.2020	

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