

COURSE DESCRIPTION CARD – SPECIMEN

Faculty of Electrical Engineering									
Field of study	Automatic Control and Robotics							Degree level and programme type	Bachelor's degree
Specialization/ diploma path	general							Study profile	
Course name	Industrial networks							Course code	IS-FEE-10055W
								Course type	elective
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	Semester	winter
	30			30				No. of ECTS credits	5
Entry requirements	-								
Course objectives	This course deals with study of engineering principles and methodologies used to design, configure and programming of the industrial network: PROFIBUS DP. Emphasis is placed on hardware and software engineering due to PLC controller's networks based on the SIMATIC. This course fulfils the general maintenance of industry process-data exchanging between PLCs in the real-time control systems. A practice knowledge to network configuration and run-operations for peripheral devices and network diagnostics is also introduced.								
Course content	Basic of PLC programming. Introduction to industrial network Ethernet and PROFIBUS DP. Physical layer, cabling, parameters. Types of data transmission, communication's protocols and bus data access methods. Fundamentals principles of PROFIBUS DP communication. Isochronous real-time (IRT) mode, layers and addressing of active and passive components. Programming of synchronous and asynchronous data exchange in PROFIBUS DP based on the SIMATIC. Diagnostic of PROFIBUS DP: diagnostic functions, errors detects and faults localization, monitoring, alarms and software blocks of PLC to data errors recording.								
Teaching methods	power-point presentations, PLC programming software, PLC simulators, text books and other technical data								
Assessment method	lecture – written exam, project – project completion, presentation and discussion, performance of the project								
Symbol of learning outcome	Learning outcomes							Reference to the learning outcomes for the field of study	
LO1	basic knowledge of principle of Ethernet and PROFIBUS DP network and communication protocols							K_W16 K_W18	
LO2	ability to programming of data exchange in the real-time industrial control systems and knowledge of distributed peripheral control devices							K_W15 K_W16 K_W18	

LO3	basic knowledge of performing diagnostic software methods and topology design of PROFIBUS DP network and hardware components	K_W16 K_W18	
LO4	practical skills to design, configure, parameters set-up, start-run and service of the industrial network: PROFIBUS DP	K_U17	
LO5	practical skills to programming of communication functions for PROFIBUS DP	K_U17	
LO6	practical skills to programming diagnostic software methods, demand for cooperation with other student within group, as well as an increased awareness of its vital importance for development	K_U17, K_K04	
Symbol of learning outcome	Methods of assessing the learning outcomes	Type of tuition during which the outcome is assessed	
LO1	written exam, project evaluation, activity on project classes	L, P	
LO2	written exam, project evaluation, activity on project classes	L, P	
LO3	written exam, project evaluation, activity on project classes	L, P	
LO4	project evaluation, activity on project classes	P	
LO5	project evaluation, activity on project classes	P	
LO6	project evaluation, activity on project classes	P	
Student workload (in hours)		No. of hours	
Calculation	lecture attendance	30	
	participation in classes, laboratory classes, etc.	30	
	preparation for classes, laboratory classes, projects, seminars, etc.	27	
	working on projects, reports, etc.	12	
	participation in student-teacher sessions related to the classes/seminar/project	4	
	implementation of project tasks, preparation for and participation in exams/tests	32	
	TOTAL:	135	
Quantitative indicators		HOURS	No. of ECTS credits
Student workload – activities that require direct teacher participation		64	2.5
Student workload – practical activities		71	3
Basic references	1. Sunit Kumar Sen, Fieldbus and Networking in Process Automation, Second Edition, CRC press, 2021. 2. Manfred Popp The New Rapid Way to PROFIBUS DP, PROFIBUS Nutzerorganisation e.V., 2004. 3. EN 50170-2 PROFIBUS, EN 50254-3 PROFIBUS-DP.		
Supplementary references	1. Teacher's materials and instructions. 2. TIA portal help. 1. www.profibus.com.		
Organisational unit conducting the course	Department of Automatic Control and Robotics	Date of issuing the programme	

Author of the programme	Assoc Prof. Arkadiusz Mystkowski, PhD, DSc, Eng	27.01.2023
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L – lecture, C – classes, LC – laboratory classes, P – project, SW – specialization workshop, FW - field work,

S – seminar