COURSE DESCRIPTION CARD – SPECIMEN

<table>
<tr><td colspan="10">Faculty of Electrical Engineering</td></tr>
<tr><td>Field of study</td><td colspan="6">Automatic Control and Robotics</td><td>Degree level and programme type</td><td>Bachelor's degree</td></tr>
<tr><td>Specialization/ diploma path</td><td colspan="6">general</td><td>Study profile</td><td></td></tr>
<tr><td rowspan="2">Course name</td><td colspan="6" rowspan="2">Industrial networks</td><td>Course code</td><td>IS-FEE-10064S</td></tr>
<tr><td>Course type</td><td>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>summer</td></tr>
<tr><td>30</td><td></td><td></td><td>30</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">-</td></tr>
<tr><td>Course objectives</td><td colspan="9">This course deals with study of engineering principles and methodologies used to design, configure and programing 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.</td></tr>
<tr><td>Course content</td><td colspan="9">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.</td></tr>
<tr><td>Teaching methods</td><td colspan="9">power-point presentations, PLC programming software, PLC simulators, text books and other technical data</td></tr>
<tr><td>Assessment method</td><td colspan="9">lecture – written exam, project – project completion, presentation and discussion, performance of the project</td></tr>
<tr><td>Symbol of learning outcome</td><td colspan="7">Learning outcomes</td><td colspan="2">Reference to the learning outcomes for the field of study</td></tr>
<tr><td>LO1</td><td colspan="7">basic knowledge of principle of Ethernet and PROFIBUS DP network and communication protocols</td><td colspan="2">K_W16 K_W18</td></tr>
<tr><td>LO2</td><td colspan="7">ability to programming of data exchange in the real-time industrial control systems and knowledge of distributed peripheral control devices</td><td colspan="2">K_W15 K_W16 K_W18</td></tr>
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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

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