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">-</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-10055W</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>winter</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 industrial network 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 PROFIBUS DP network and communication protocols</td><td colspan="2"></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"></td></tr>
<tr><td>LO3</td><td colspan="7">basic knowledge of performing diagnostic software methods and topology design of PROFIBUS DP network and hardware components</td><td colspan="2"></td></tr>
<tr><td>LO4</td><td colspan="7">practical skills to design, configure, parameters set-up, start-run and service of the industrial network: PROFIBUS DP</td><td colspan="2"></td></tr>
<tr><td>LO5</td><td colspan="7">practical skills to programming of communication functions for</td><td colspan="2"></td></tr>
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	PROFIBUS DP	
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	
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	**80**	**3**

Basic references	1. Manfred Popp The New Rapid Way to PROFIBUS DP, PROFIBUS Nutzerorganisation e.V., 2004. 2. Mahalik N. P., Fieldbus Technology: Industrial Networks Standards for Real-Time Distributed Control, Springer, 2003. 3. EN 50170-2 PROFIBUS, EN 50254-3 PROFIBUS-DP, ICS 61158 i 61784 PROFINET.
Supplementary references	1. Hugh J., Automating Manufacturing Systems with PLCs, E-book, Ver. 5.0, 2007. 2. S. Mackay, E. Wright, D. Reynders, J. Park, Practical Industrial Data Networks: Design, Installation and Troubleshooting (IDC Technology), Elsevier Linacre House, 1st edition, 2004. 3. Industrial Communication Catalog IK PI, SIEMENS, 2002/2003. 4. www.profibus.com.

Organisational unit conducting the course	**Department of Automatic Control and Electronics**	**Date of issuing the programme**
Author of the programme	**Assoc Prof. Arkadiusz Mystkowski, PhD, DSc, Eng**	**25.03.2020**