



The Faculty of:	Faculty of Electrical Engineering and Informatics
Field of study:	Automatic Control and Robotics (ER)
Speciality:	
Study degree (BSc, MSc):	BSc, first circle full time studies

COURSE UNIT DESCRIPTION

Course title:	Industrial networks
Lecturer responsible for course:	Marcin Bednarek, PhD
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Department : Department of Computer and Control Engineering	

Semester	Weekly load	Type of classes				Number of ECTS credits
		L Lectures	C Theoretical Classes	Lb Laboratory	P Project	
4	3	30			15	3

Course description
<p>Lecture: DCS, SCADA systems – characteristics. Distributed and centralized control. Process station, engineering station, operator station. Industrial networks (classification, characteristics, basic information, protocols, the differences between a standard computer network and fieldbuses, network models, simplified model of industrial network), Real-time network. Examples of industrial networks. Industrial network communication protocols - Modbus, Profibus, Interbus, CAN, LIN, FIP, a review of other solutions. Protocols conversion. Special purpose industrial networks. Communication in wide area distributed industrial systems, examples of solutions. Modbus TCP. Industrial Ethernet. Transmission medium access control. Data exchange methods in industrial networks: cyclic, aperiodic, time parameters. Diagnosis process and operation of an industrial network. Safety and security aspects. Wireless communication in industrial networks, radiomodems.</p>
<p>Classes:</p>
<p>Laboratory:</p>
<p>Project: Planning, analysis, operation and configuration of industrial networks in distributed control systems DCS (Modbus, CAN – Freelance 2000, InTouch, iFix software; Profibus – ABB AC800F, Modbus TCP (Ethernet) - Wonderware Factory Suite, communication between operator station and engineering station, RPM package). Process variable – remote access.</p>

Objectives of the course

Knowledge about: industrial computer networks (planning and configuration of industrial networks), industrial network structure and functioning in the DCS.

Examination method

Lecture: written test, oral discussion

Projects: written solution of design problems, oral discussion.

Bibliography

1. Sacha K.: Sieci miejscowe Profibus. MIKOM, Warszawa 1998
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4. Modbus Application Protocol Specification V1.1a, Modbus-IDA June 4, 2004
5. Object Messaging Specification for the MODBUS/TCP Protocol Version 1.1. Modbus-IDA, November 8, 2004
6. Solnik W. ; Zajda Z.: Profibus. Technologie i aplikacje. Opis systemu. Profibus PNO, Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 2005
7. Komputerowe sieci przemysłowe Profibus DP i MPI
8. Bednarek M.: Wizualizacja procesów. Laboratorium, Oficyna Wydawnicza Politechniki Rzeszowskiej, Rzeszów 2004
9. Bender K.: Profibus. The Fieldbus for Industrial Automation, Prentice Hall International 1993
10. Trybus L.: Regulatory wielofunkcyjne, Wydawnictwo Naukowo-Techniczne, Warszawa 1992
11. Sacha K.: Systemy czasu rzeczywistego. Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 1999
12. Legierski T. i inni: Programowanie sterowników PLC, Wydawnictwo Pracowni Komputerowej Jacka Sklamierskiego, Gliwice 1998
13. Kasprzyk J. Programowanie sterowników przemysłowych, Wydawnictwo Naukowo-Techniczne, Warszawa 2006
14. Walkowiak K.: Algorytmy wyznaczania przepływów typu unicast i anycast w przeżywalnych sieciach zorientowanych połączeniowo, Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 2007

Lecturer signature	
Head of Department signature	
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