

DESCRIPTION OF THE COURSES

- Course code: ARR3215
- Course title: DISTRIBUTED AUTOMATION SYSTEMS
- Language of the lecturer: Polish

<i>Course form</i>	<i>Lecture</i>	<i>Classes</i>	<i>Laboratory</i>	<i>Project</i>	<i>Seminar</i>
<i>Number of hours/week*</i>	<i>1</i>			<i>2</i>	
<i>Number of hours/semester*</i>	<i>15</i>			<i>30</i>	
<i>Form of the course completion</i>	<i>credit</i>			<i>credit</i>	
<i>ECTS credits</i>	<i>1</i>			<i>2</i>	
Total Student's Workload	<i>30</i>			<i>60</i>	

- Level of the course (basic/advanced): *basic*
 - Prerequisites: Programmable Logic Controllers
 - Name, first name and degree of the lecturer/supervisor: Czesław T. Kowalski dr hab. inż.
 - Names, first names and degrees of the team's members: Krzysztof Dyrz, dr inż., Marcin Pawlak dr inż., Zdzisław Żarczyński, mgr inż.
 - Year:....3..... Semester:....6.....
 - Type of the course (obligatory/optional): *obligatory*
 - Aims of the course (effects of the course): learn of architecture and operation of distributed systems and their application in automation
 - Form of the teaching (traditional/e-learning): *traditional*
- Course description: *The lecture program deals with the architecture and operation of the computer real-time systems, including distributed systems. Introduction to computer networks. Physical basis of information transmission. Network topologies, wireless networks, , network protocols, web services, transmission safety. Distributed systems, distributed operation systems, distributed calculations, features of distributed systems (budgeting, openability, scalability, concurrency). Architecture of distributed systems, models of distributed processing. Real-time systems. Characteristics of the real-time distributed systems. Basics of communication and synchronization. Inter-process and inter-processor connections. Switching techniques. Monitoring systems. Monitoring of the process level and realized functions. Hardware and software monitoring for one and multiprocessor systems. Distributed file systems, distributed common memory, distributed transactions, distributed data base.*

- Lecture:

<i>Particular lectures contents</i>	<i>Number of hours</i>
<i>1.Introduction to computer networks. Physical basis of information transmission.</i>	<i>1</i>
<i>2.Network model OSI. Network protocols of lower layer. Ethernet. Wireless networks. Net hardware. TCP/IP, IPX/SPX protocols.</i>	<i>2</i>
<i>3.Computer addressing, datagrams and sessions (UDP, TCP), testing</i>	<i>2</i>

<i>protocols, web services, transmission safety.</i>	
4. <i>Distributed systems, distributed operation systems, distributed calculations, features of distributed systems (budgeting, openability, scalability, concurrency).</i>	2
5. <i>Architecture of distributed systems, models of distributed processing. Real-time systems. Characteristics of the real-time distributed systems.</i>	2
6. <i>Basics of communication and synchronization. Inter-process and inter-processor connections. Switching techniques.</i>	2
7. <i>Monitoring systems. Monitoring of the process level and realized functions. Hardware and software monitoring for one and multiprocessor systems.</i>	2
8. <i>Distributed file systems, distributed common memory, distributed transactions, distributed data base.</i>	2

- Classes – the contents:
- Seminars – the contents:
- Laboratory – the contents:
- Project – the contents:

Learning of basic problems connected with the design and application of computer based distributed systems. Practical exercises with simple tasks connected with the design of computer systems using distributed processes and threads for different functional tasks, which cooperate in local and net environment.

1. *1. Net structure configuration, web services configuration in operation systems Windows NT/XP, UNIX/Linux*
2. *Net hardware and software diagnosis.*
3. *Application of TCP/IP protocol in industrial networks.*
4. *Industrial networks PROFIBUS DP*
5. *Design of Client – Server applications.*
6. *Visualization in distributed systems.*
7. *Design of distributed applications using PLC Simatic and Wonderware FactorySuite environment.*

- Basic literature:

1. *Tanenbaum A., Marten van Steen, Systemy rozproszone. Zasady i paradygmaty, WNT 2006*
2. *Comer, Douglas., Sieci komputerowe i intersieci, WNT, Warszawa 2000*
3. *Coulouris, George. Systemy rozproszone: podstawy i projektowanie, Warszawa, WNT 1999.*
4. *Karbowski A., Niewiadomska-Szymkiewicz W., Obliczenia równoległe i rozproszone, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2001*

- Additional literature:

Craig Hunt, TCP/IP Administracja sieci, Read ME, Łódź 1996

- Conditions of the course acceptance/creditation: *Credit of lecture (written test) and project.*

* - depending on a system of studies