FACULTY OF ELECTRICAL ENGINEERING

SUBJECT CARD

Name in Polish:	**Rozproszone systemy automatyki**
Name in English:	**Distributed automation systems**
Main field of study (if applicable):	**Industrial Control Engineering**
Specialization (if applicable):	
Level and form of studies:	**1st level, full-time**
Kind of subject:	**optional**
Subject code:	**APR013215**
Group of courses:	**NO**

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU):	15		30		
Number of hours of total student workload (CNPS):	30		60		
Form of crediting:	crediting with grade		crediting with grade		
For group of courses mark (X) final course:					
Number of ECTS points:	1		2		
including number of ECTS points for practical (P) classes :			2		
including number of ECTS points for direct teacher-student contact (BK) classes:	0.70		1.40		

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Has a basic knowledge of programmable controller.
2. Has a basic knowledge of industrial automation systems and communications networks.
3. Can practically apply the knowledge of programmable controllers and their components.

SUBJECT OBJECTIVES

C1. Familiarize students with a basic knowledge of the distributed automation systems.
C2. Familiarize students with the types of industrial networks used in distributed automation systems.
C3. Practical familiarize students with the devices used in distributed control systems.
C4. The acquisition and consolidation of social competences including emotional intelligence involving the ability to work in a group of students with a view to effective problem solving. Responsibility, honesty and fairness in the procedure observance in force in academia and society.

SUBJECT LEARNING OUTCOMES

relating to knowledge:

PEU_W01 Has knowledge in the application of PLC in distributed automation systems.
PEU_W02 Knows what are the characteristics of a distributed automation system.

relating to skills:

PEU_U01 He can use the programmable controller in distributed automation systems.
PEU_U02 He can formulate control algorithm in a distributed automation system and write program for the selected controller

relating to social competences:

PEU_K01 It has a sense of responsibility for own work and willingness to comply with the principles of teamwork and the responsibility for jointly implemented actions.

PROGRAMME CONTENT		
Form of classes - lecture		**Number of hours:**
Lec 1	Introductory classes. Basic definitions and notions.	2
Lec 2	Construction and programming of PLC and distributed modules.	3
Lec 3	Real-time systems in distributed automation systems. Components of the distributed automation system.	2
Lec 4	Communication in distributed automation systems. Examples of industrial communication networks.	3
Lec 5	SCADA and DCS in the distributed control systems.	2
Lec 6	Data exchange using DDE and OPC protocols.	2
Lec 7	Final test	1
	Total hours:	**15**

Form of classes - laboratory		**Number of hours:**
Lab 1	Introduction to the rules and regulations of internal safety lab. General familiarization with laboratory equipment.	2
Lab 2	Implementation of the selected basic control system using a PLC	2
Lab 3	Implementation of advanced control functions in a selected control system using a PLC controller and a industrial process model	4
Lab 4	Introductory classes for the use of communication networks and distributed modules	2
Lab 5	Implementation of a selected industrial process using distributed modules and a communication network	8
Lab 6	Programming of the visualization system with the use of HMI panels	4
Lab 7	Programming of the visualization system with the use of SCADA software	4
Lab 8	Programming cooperation of PLC with selected DCS system	2
Lab 9	Credit for the grade	2
	Total hours:	**30**

TEACHING TOOLS USED
N1. The lecture in the traditional manner.
N2. Multimedia presentation.
N3. Consultation.
N4. Final test.
N5. Traditionally carried out laboratory.

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT		
Evaluation *F – forming (during semester)* *P – concluding (at semester end)*	**Educational effect number**	**Way of evaluating educational effect achievement**
F1(W)	PEU_W01 PEU_W02	Final test.
P(W)	P=F1	
F1(L)	PEU_U01 PEU_U02	Activity in laboratory classes
F2(L)	PEU_U01 PEU_U02	Assesment of written programs.
F3(L)	PEU_U01 PEU_U02 PEU_K01	Assesment of the final report
P(L)	P=0,2*F1+0,6*F2+0,2*F3	

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Werewka J., Systemy rozproszone sterowania i akwizycji danych, CCATIE vol. 9, Kraków 1998
[2] Grega W., Sterowanie cyfrowe w czasie rzeczywistym, Wyd. wydz. AAIiE AGH, Kraków 1999
[3] Kasprzyk J., Programowanie sterowników przemysłowych, WNT, Warszawa 2006
[4] Flaga S., Programowanie sterowników PLC w języku drabinkowym, Wyd. BTC, Legionowo, 2010

SECONDARY LITERATURE:

[1] Dokumentacje techniczne producentów sterowników PLC
[2] Dokumentacje techniczne producentów systemów SCADA i DCS

SUBJECT SUPERVISOR
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