STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
Fieldbusses and distributed control systems		**1010331171010335158**

Field of study	Profile of study (general academic, practical)	Year /Semester
Control Engineering and Robotics	**(brak)**	**4 / 7**
Elective path/specialty	Subject offered in:	Course (compulsory, elective)
-	**polish**	**elective**

Cycle of study:	Form of study (full-time,part-time)
First-cycle studies	**full-time**

No. of hours					No. of credits
Lecture: **2**	Classes: **-**	Laboratory: **2**	Project/seminars: **-**		**5**

Status of the course in the study program (Basic, major, other)	(university-wide, from another field)
(brak)	**(brak)**

Education areas and fields of science and art	ECTS distribution (number and %)
technical sciences	**5 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	K_W17: K_W18: K_W22:
2	**Skills**	K_U10: K_U14: K_U18:
3	**Social competencies**	K_K01:

Assumptions and objectives of the course:

The aim of the course is to understand the theoretical foundations, principles and typical applications of the fieldbusses and distributed control systems. Student at the end of training should be able to choose the appropriate fieldbus to a particular object technology. Students can also choose appropriately distributed control system.

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. K_W18 - [K_W18]
2. K_W21 - [K_W21]
3. K_W13 - [K_W13]

Skills:

1. K_U13 - [K_U13]
2. K_U18 - [K_U18]
3. K_U17 - [K_U17]

Social competencies:

1. K_K02 - [K_K02]

Assessment methods of study outcomes

Lecture: Assessment of the lecture is written exam of based on design case solution.

Laboratory: Assessment of laboratory requires doing indicated exercises and giving reports

Course description

Implementation of typical automation structures. PLC communication systems. Analysis of the fieldbusses in the schema ISO-OSI layer model. Examples of the construction, operation and use of the busses: AS-i, Modbus, CAN, Profibus, HART, Ethernet Powerlink. Description of the operation and use of the structure of industrial communication through a Wide Area Network. The use of network protocols SMTP, FTP, HTTP to remote management of the control system. Distributed control systems (DCS) in process control systems. DCS System Structure: Object equipment, wiring, actuators, process stations, operator and engineering stations. Continuous process control algorithms - PID elementary modifications, the specifics of distributed control. Analysis of commercial solutions - Honeywell - Experion, Siemens - PCS7, Emerson - Delta. Additional features of the DCS: autotuning, system diagnostics. Laboratory exercises illustrate the issues discussed during the lectures.

Basic bibliography:

1. Due to the lack of widely available literature, lecture material, published on the Internet and web sites various are the basis material.

2. Zimmermann W., Schmidgall R.:Magistrale danych w pojazdach. Protokoły i standardy, Wydawnictwa Komunikacji i Łączności 2008

Additional bibliography:

1. Technical documentation by Honeywell, Siemens, Emerson

Result of average student's workload

Activity	Time (working hours)
1. Lectures	30
2. Laboratory exercises.	30
3. Consultations and examination	5
4. Preparation to laboratory exercises and elaboration of reports.	40
5. Preparation to tests and examination.	20

Student's workload

Source of workload	hours	ECTS
Total workload	125	5
Contact hours	65	2
Practical activities	60	2