STUDY MODULE DESCRIPTION FORM

Name of the module/subject	Code
SCADA systems and PLCs	**1010321371010326004**

Field of study	Profile of study (general academic, practical)	Year /Semester
Electrical Engineering	**(brak)**	**4 / 7**

Elective path/specialty	Subject offered in:	Course (compulsory, elective)
Electrical and Computer Systems in	**Polish**	**obligatory**

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

No. of hours				No. of credits
Lecture: **-** Classes: **-** Laboratory: **30**	Project/seminars:	**15**		**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:	Responsible for subject / lecturer:
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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Basic knowledge of electrical engineering, electronics and computer science.
2	**Skills**	Basics of programming in C, Pascal or other high-level language.
3	**Social competencies**	He is aware the need to expand his competence, ready to to cooperate within a team.

Assumptions and objectives of the course:

The objective of the course is to familiarize students with the principles of designing, constructing and operation of a control and a visualization system, configuration of the elements of a system and capabilities of SCADA environments. Another objective is getting familiar with the possibility to work in simulation mode and with a real object monitored by PLC driver.

Design his own visualization and control project. Presentation of solution.

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

Knowledge:

1. it has an elementary knowledge of the use of IT tools in SCADA systems in programming with dedicated languages, design of signal transmission network and use of databases - [K_W11++]

2. it has an elementary knowledge of the structure, operation and selection of the PLC (including simulated) cooperating with the visualization and control SCADA systems - [K_W22++]

3. it has a basic and systematic knowledge of the design and programming of microprocessor and PLC used in industrial process control - [K_W07+]

Skills:

1. he can formulate a process control algorithm and implement it using appropriate programming languages - [KU_04+++]

2. he is able to simulate real operating conditions and parameters of an industrial process using SCADA system - [KU_02++]

3. he knows how to correctly select the design objectives and make a presentation showing the characteristics of the proposed SCADA system - [KU_12+]

Social competencies:

1. he is aware importance of their own work and teamwork, can be responsible for implemented design tasks - [K_K03++]

Assessment methods of study outcomes

Laboratories:

? continuous evaluation for each course - rewarding growth of skills in using the rules and methods,

? evaluate the knowledge and skills under the project first completion.

Projects:

? implementation and presentation of the project visualization and control of the process,

? ability to cooperate within a team implementing practically design task,

? presentation of the current progress of the project.

Course description

Topics concerning the laboratory part of the course include: configuration of the communication with external devises, creation of synoptic screens, defining variables, configuration of alarms, charts (trends), recording events, elements of programming, securing the system from unauthorized access (configuration of users and systems of privileges), servicing of events, reports, keyboard shortcuts, work with actual driver and familiarizing with other chosen elements of SCADA system. During the project activities visualization and steerage drafts in simulation or real-time mode are being made. Every project is additionally shown in a form of presentation.

Laboratory: practice using of functionality and possibilities of the system, computer classes covering a range of topic.

Designing: Individual project / team with the current presentation of the objectives and progress in the implementation.

Basic bibliography:

1. Cupek R., Metody wizualizacji rozproszonych procesów przemysłowych. Praca doktorska, PŚ, Gliwice, 1998

2. Marciniak P., Wprowadzenie teoretyczne do systemów SCADA, Self Publishing, 2013

3. Jakuszewski R., Programowanie systemów SCADA., Gliwice, 2006

Additional bibliography:

1. Kościelny J. M., Systemy nadzorowania i wizualizacji procesów przemysłowych ? wymagania, kryteria oceny, PW, Warszawa, 1998

2. Kasprzyk J., Programowanie sterowników przemysłowych., WNT, Warszawa, 2006

3. Broel-Plater B., Układy wykorzystujące sterowniki PLC. Projektowanie algorytmów sterowania, Wydawnictwo Naukowe PWN SA, Warszawa, 2008.

4. Kwaśniewski J., Sterowniki PLC w praktyce inżynierskiej, Wydawnictwo BTC, Legionowo, 2008.

5. Schneider Electric, Vijeo Citect 7.1, 7.2 - Pierwsze kroki, Instytut Szkoleniowy Schneider Electric, Warszawa

6. CiTechnologies: System pomocy środowiska CitectSCADA., 2006-2012

7. Internet.

8. Diploma theses of IEEP

Result of average student's workload

Activity	Time (working hours)
1. participation in laboratory classes	30
2. participation in project activities	15
3. the consulting	20
4. preparation for active participation in laboratory classes	20
5. preparation for presentations in class project	10
6. implementation of projects	30
7. preparation for the pass the project	10
8. reckoning projects and presentations	6

Student's workload

Source of workload	hours	ECTS
Total workload	141	5
Contact hours	71	3
Practical activities	126	5