STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
SCADA systems		**1010314481010324972**

Field of study	Profile of study (general academic, practical)	Year /Semester
Power Engineering	**(brak)**	**4 / 8**

Elective path/specialty	Subject offered in:	Course (compulsory, elective)
Ecological Source of Electrical Energy	**Polish**	**obligatory**

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

No. of hours				No. of credits
Lecture: **9**	Classes: **-**	Laboratory: **-**	Project/seminars: **9**	**3**

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	**3 100%**

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, computer science and automation. It has an elementary knowledge of the structure, operation, selection and PLC programming.
2	**Skills**	Basics of programming in C, Pascal or other high-level language. He can formulate process control algorithm and select design objectives.
3	**Social competencies**	He is aware importance of their own work and teamwork, he can take over responsibility for the performed design tasks.

Assumptions and objectives of the course:

Introduction to the principles of design, construction and operation of the control and visualization system, configuration of system components and the possibility of SCADA environments. Knowing with the possibility of simulation mode and particularly with the real object controlled by the PLC.

Implementation of own project and documentation using a PLC.

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

Knowledge:

1. he has extended knowledge in the use of IT tools in SCADA systems, designing and programming the PLC algorithms used in industrial process control, in particular with the use of RES - [K_W20+++]

2. he has a systematic knowledge of current achievements and trends in the development of the theory of control and visualization of industrial processes in renewable energy - [K_W08+, K_W09++]

Skills:

1. he can lead and supervise the work of the project team in the quest for effective implementation of the task - [KU_02+++]

2. he can develop a complete documentation of the project - [KU_01++]

3. he can formulate objectives and specification of the project cooperation of the device with PLC and SCADA systems in accordance with current rules and regulations - [KU_10++]

Social competencies:

1. he takes efforts to accurately and clearly present the achievements in the field of SCADA systems with PLCs in RES systems, presenting several possible potential design solutions - [K_K02++, K_K04+]

Assessment methods of study outcomes

Wykład:

- weryfikacja wiedzy niezbędnej w trakcie zajęć projektowych w ciągu semestru,
- zaliczenie w postaci testu pisemnego na ostatnich zajęciach wykładowych.

Zajęcia projektowe:

- wykonanie projektu wizualizacji i sterowania wybranym procesem wykorzystującym współpracę ze sterownikiem PLC,
- umiejętność współpracy w ramach zespołu praktycznie realizującego zadanie projektowe.

Course description

The lecture is characteristic of SCADA systems with a special focus the practical aspects of the principles of operation, configuration, and operation of selected components. Within the course of project cooperation will SCADA system with real PLC in the energy system. The focus is directed to present possibilities, principles and universality of exchange of information between the SCADA system and any PLC.

Design: Individual/team project based on PLC and SCADA software cooperation. Execution of studies the project.

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. Schneider Electric, Vijeo Citect 7.1, 7.2 - Pierwsze kroki, Instytut Szkoleniowy Schneider Electric, Warszawa
4. Broel-Plater B., Układy wykorzystujące sterowniki PLC. Projektowanie algorytmów sterowania, Wydawnictwo Naukowe PWN SA, Warszawa, 2008.
5. CiTechnologies: System pomocy środowiska CitectSCADA., 2006-2012
6. Schneider Electric, Vijeo Citect 7.1, 7.2 - Pierwsze kroki, Instytut Szkoleniowy Schneider Electric, Warszawa
7. Prace dyplomowe IEiEP
8. Internet

Result of average student's workload

Activity	Time (working hours)
1. participation in lectures	9
2. participation in project activities	9
3. the consulting	10
4. analysis of the literature exploring the topics of lectures	10
5. preparation for the pass of the lecture	8
6. preparation for the pass the project	20
7. reckoning of projects	2

Student's workload

Source of workload	hours	ECTS
Total workload	68	3
Contact hours	30	1
Practical activities	31	1