



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

SCADA systems in industry [S1Elmob1>PO9-SCADAwp]

### Course

Field of study

Electromobility

Year/Semester

4/7

Area of study (specialization)

–

Profile of study

general academic

Level of study

first-cycle

Course offered in

Polish

Form of study

full-time

Requirements

elective

### Number of hours

Lecture

0

Laboratory classes

30

Other

0

Tutorials

0

Projects/seminars

0

### Number of credit points

3,00

### Coordinators

mgr inż. Damian Gluchy

damian.gluchy@put.poznan.pl

dr inż. Grzegorz Trzmiel

grzegorz.trzmiel@put.poznan.pl

### Lecturers

### Prerequisites

Basic knowledge of electrical engineering, electronics and computer science. Basics of programming in C, Pascal or other high-level language. Is aware of the need to expand their competences, readiness to cooperate within a team.

### Course objective

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.

### Course-related learning outcomes

Knowledge:

1. has elementary knowledge in the field of using IT tools in SCADA systems, programming in dedicated languages, designing signal transmission networks and using databases,
2. has elementary knowledge about the construction, operation principles and selection of PLC controllers (including simulated ones) cooperating with SCADA visualization and control systems,
3. has basic and systematic knowledge in the field of design and programming of microprocessor systems and PLC controllers used in industrial process control.

#### Skills:

1. is able to formulate a process control algorithm and implement it using appropriate programming languages,
2. can simulate real working conditions and industrial process parameters using the SCADA system,
3. knows how to correctly select design assumptions and make presentations showing the characteristics of the designed SCADA system.

#### Social competences:

1. is aware of the importance of own and team work, can be responsible for implemented project tasks.

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The skills acquired during the laboratory classes are verified on the basis of: assessing activity in each class, rewarding the increase in the ability to use the learned rules and methods, verification of skills, when completing the project - thematically related to the field of study.

### Programme content

The module program includes issues related to practical learning of design, programming and practical use of SCADA systems (visualization, control and data acquisition).

### Course topics

The laboratory program includes the following issues:

Configuring communication with external devices, creating synoptic screens, defining variables, configuring alarms, charts (trends), recording events - logs, programming elements, securing the system against unauthorized access (configuration of users and authorization system), handling events, reports, keyboard shortcuts, working with a real industrial controller and getting acquainted with other selected elements of the SCADA system. Introducing modern application solutions used in practice, in particular in issues related to electromobility, such as: visualization of the status and parameters of selected vehicle components, charging stations, communication and security systems, monitoring the technical condition of vehicles, their location, service information, etc.

### Teaching methods

Laboratories: practical knowledge of the functionality and capabilities of the SCADA system, computer classes covering the scope of the topic.

Projects: The use of computer and multimedia equipment with dedicated software to present current progress in the implementation of final projects.

### Bibliography

#### Basic:

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:

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

6. Kamiński K., Programowanie układów sterowania z PLC, Wydawnictwo Krzysztof Kamiński, Gdynia 2009.

7. Nowak R., Pietrasz A., Trzmiel G., The control and visualisation system in an intelligent building, ITM Web Conf., vol. 19 (01041), 2018, <https://doi.org/10.1051/itmconf/20181901041>.

8. Trzmiel G., Control and visualisation of the selected industrial processes with the application of SCADA system, Monograph Computer Applications in Electrical Engineering, Poznan University of Technology 2015, vol. 13, pp. 161 - 177.

9. Kurz D. Łopatka M., Trzmiel G., The use of the SCADA system in the monitoring and control of the performance of an autonomous hybrid power supply system using renewable energy sources, E3S Web of Conferences, vol. 44, 2018 (00180), <https://doi.org/10.1051/e3sconf/20184400180>.

10. Głuchy D., Possibilities of use of the SCADA system for control and visualization of the RES operation, Post-conference Monograph „Computer Applications in Electrical Engineering”, vol. 14, 2016, Poznań, Polska, str. 340-351.

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

12. Internet: specialist subject literature, datasheets, standards.

### Breakdown of average student's workload

	Hours	ECTS
Total workload	80	3,00
Classes requiring direct contact with the teacher	30	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	50	2,00