

## DESCRIPTION OF THE COURSES

- Course code: **ARR2507**
- Course title: **COMPUTER CONTROL OF POWER SYSTEMS**
- Language of the lecturer: **Polish, English**

<i>Course form</i>	<i>Lecture</i>	<i>Classes</i>	<i>Laboratory</i>	<i>Project</i>	<i>Seminar</i>
<i>Number of hours/week*</i>	<b>2</b>				<b>1</b>
<i>Number of hours/semester*</i>	<b>30</b>				<b>15</b>
<i>Form of the course completion</i>	<b>Test</b>				<b>Presentation</b>
<i>ECTS credits</i>					
<i>Total Student's Workload</i>					

- Level of the course (basic/advanced): **advanced**
- Prerequisites: **credits for Fundamentals of computer science, Power systems**
- Name, first name and degree of the lecturer/supervisor:  
**Kazimierz Wilkosz, PhD, DSc./Professor**
- Names, first names and degrees of the team's members:  
**prof. Marian Sobierajski,**  
**dr. Robert Łukomski.**
- Year: **1** Semester: **2 (the second-level study)**
- Type of the course (obligatory/optional): **optional**
- Aims of the course (effects of the course):
  - **familiarizing with problems of power system computer control,**
  - **familiarizing with modern computer systems for power system control,**
  - **familiarizing with modern techniques utilized in power system computer control,**
  - **enhancing practical skills in preparing presentation,**
  - **developing students' skills in participating in discussion.**
- Form of the teaching (traditional/e-learning): **traditional**
- Course description:

**Broaching problems related to computer control of modern power systems. Presentation of principles for designing these systems. Broaching modern computer control systems in power stations, power substations, control centers. Familiarizing with computer control systems utilized in Poland.**

- Lecture:

<i>Particular lectures contents</i>	<i>Number of hours</i>
<b>1. Introduction, the lecture program, requirements Basic terms and definition.</b>	<b>2</b>
<b>2. Formulating a task of power system control. General characteristics of system of power system control. The Open System Environment.</b>	<b>2</b>

3. Problems of a dispatcher power system control.	2
4. Computer systems in dispatcher control centers. EMS.	2
5. SCADA, MINISCADA - supervisory control and data acquisition. Systems of open data acquisition.	2
6. Remote data stations. Computer control of a power substation.	2
7. Test. Computer control in a power station.	2
8. Dispatcher training simulators.	2
9. Power system control in conditions of existence of connections with other power systems.	2
10. Utilization of artificial intelligence in computer control systems of power systems.	2
11. Operating systems in computer control systems of power systems.	2
12. Designing, developing and implementing computer control systems of power systems.	2
13. Computer control and power system security. Testing requirements specifications.	2
14. Influence of electric energy market on power system control.	2
15. Test.	2

- Classes – the contents:
- Seminars – the contents:  
Familiarizing with real computer control systems of power systems and with solution of the problems (to which attention is paid at the lecture) related to them.
- Laboratory – the contents:
- Project – the contents:
- Basic literature:
  1. Gładys H., Komputery w kierowaniu pracą systemu elektroenergetycznego, Warszawa, WNT 1990.
  2. Gładys H., Praca elektrowni w systemie elektroenergetycznym, Warszawa, WNT 1999.
  3. Kujszczyk Sz., Informatyzacja zakładów energetycznych, Warszawa, WNT 1990.
  4. Strauss C., Practical electrical network automation and communication systems, Elsevier 2003.
  5. Waha J. P. (Ed.), Control of power plants and power systems, Elsevier 2000.
- Additional literature:
  1. Donald G. Fink, Standard Handbook for Electrical Engineers. Section 10: Power-System Components/SCADA. McGraw-Hill Professional 1999.
  2. Flynn D. (Ed.), Thermal Power Plant Simulation and Control, The Institution of Engineering and Technology 2003.
  3. Popovic D., Bhatkar V. P., Distributed Computer Control Systems in Industrial Automation, Marcel Dekker - Taylor & Francis 1990.
  4. Papers in professional journals.
- Conditions of the course acceptance/creditation:  
*Lectures:* positive tests  
*Seminar:* positive evaluation of prepared presentations

\* - depending on a system of studies