DESCRIPTION OF THE COURSES

- Course code: **ELR2521**
- Course title: **COMPUTER CONTROL OF POWER SYSTEM**
- Language of the lecturer: **Polish, English**

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

- Level of the course (basic/advanced): **advanced**
- Prerequisites: **credit for a course on 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:
  dr. Robert Łukomski
- Year: **1** Semester: **3 (the second-level study)**
- Type of the course (obligatory/optional): **optional**
- Aims of the course (effects of the course):
  - **familiarising with modern concepts of power system computer control,**
  - **understanding problems of power system computer control,**
  - **providing a theoretical background for further study in science and applications in the field of 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:
  The course is intended to acquaint students with modern concepts of power system computer control. The following topics are considered: power system control, dispatcher power system control, EMS, SCADA, MINISCADA, computer control of substations, computer control in power station, computer systems in distribution company, simulators for dispatchers, power system safety when power system control is with use of computers, specific problems of computer systems used in power system. The course provides students with a theoretical background for further individual study.
- Lecture:

Particular lectures contents	*Number of hours*
1. Introduction. General terms.	**2**
2. Formulation of problem of control of power system. General	**2**

characteristics of control system of power system. Open-system standard.	
3. Problems of dispatcher power system control.	**2**
4. Computer systems in control centres. EMS.	**2**
5. SCADA, MINISCADA - supervisory control and data-acquisition system. Open data-acquisition system.	**2**
6. Remote terminal units. Computer control of substations.	**2**
7. Computer control in power station.	**2**
8. Computer systems in distribution company.	**2**
9. Simulators for dispatchers.	**2**
10. Digital representation of power system.	**2**
11. Computer power system control and power system safety. Testing requirement specification.	**2**
12. User interface in computer systems for power system control.	**2**
13. Operating systems in computer systems for the power system control.	**2**
14. Special topics of computer systems used for the needs of power systems.	**2**
15. Final test.	**1**

- Classes – the contents:
- Seminars – the contents:
  During the seminars students complete individual tasks and projects aimed at deep familiarisation with the specific problems of the computer control of power system. The students will use Internet and prepare their own presentations in Power Point.
- Laboratory – the contents:
- Project – the contents:
- Basic 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. **Strauss C., Practical electrical network automation and communication systems, Elsevier 2003.**
  4. **Waha J. P. (Ed.), Control of power plants and power systems, Elsevier 2000.**
- Additional literature:
  1. **Shahidehpour M., Wang Y., Communication and Control in Electric Power Systems: Applications of Parallel and Distributed Processing. Wiley-IEEE Press 2003.**
  2. **Papers in conference proceedings and journals.**
- Conditions of the course acceptance/credition:
  ***Lectures*: positive final test**
  ***Seminars*: positive evaluation of prepared presentations**

***** - depending on a system of studies