DESCRIPTION OF THE COURSES

- Course code: ELR2506
- Course title: ELECTRIC POWER SYSTEMS 2
- Language of the lecturer: english, polish

Course form	***Lecture***	***Classes***	***Laboratory***	***Project***	***Seminar***
*Number of hours/week**	*1*		*2*		
*Number of hours/semester**	*15*		*30*		
Form of the course completion	*examination*		*exercise reports, final test*		
ECTS credits	*2*		*2*		
Total Student's Workload	*60*		*60*		

- Level of the course (basic/advanced): basic
- Prerequisites: Mathematics, Physics, Electric Circuit Theory, Informatics, Electric Power Systems 1
- Name, first name and degree of the lecturer/supervisor: Prof. Marian Sobierajski, Ph.D., D.Sc. Associate Professor
- Names, first names and degrees of the team's members: Prof. Artur Wilczynski, Ph.D., D.Sc., Associate Professor, Robert Lis, Ph.D, Robert Łukomski, PhD
- Year:.....3..... Semester:.....6.....
- Type of the course (obligatory/optional): obligatory
- Aims of the course (effects of the course): Skill of the analysis of power system stability and energy quality.
- Form of the teaching (traditional/e-learning): traditional
- Course description: Introduction to transient phenomena in power systems - small and large disturbance stability. Quality of electricity supply. Voltage regulation in power systems. Frequency control in power systems. Electrical energy market.
- Lecture:

Particular lectures contents	*Number of hours*
1. Introduction to transient phenomena in power systems.	*2*
2. Steady-state stability - practical criteria.	*2*
3. Transient stability - equal area criteria.	*2*
4. Quality and reliability of electricity supply.	*2*
5. Voltage control in transmission and distribution networks.	*2*
6. Voltage stability.	*2*
7. Frequency control in power systems - primary and secondary regulation.	*2*

- Classes – the contents:
- Seminars – the contents:
- Laboratory – the contents:

1. Individual preparation of the power system diagram for fault analysis - per unit calculations.
2. Load flow analysis in radial power systems.
3. Load flow calculations in meshed power systems.
4. Voltage regulation in power networks.
5. Computation of balanced short circuit bus impedance matrix for meshed power systems.
6. Symmetrical fault analysis analysis using computer programs.
7. IEC method of short-circuit analysis.
8. Computation of unbalanced short circuit bus impedance matrix for meshed power systems.
9. Unsymmetrical fault analysis analysis using computer programs.
10. Computer analysis of short-circuit with ground in medium voltage network.
11. Computer analyis of limiting short-circuit currents.
12. Analysis of stability with equal area criteria.
13. Simulation of transient stability using numerical integration.
14. Final test.

- Project – the contents:
- Basic literature:

1. Machowski J., Bialek J. W., Bumby J. R., Power System Dynamics and Stability. John Wiley and Sons 1997.
2. Sobierajski M.,Łabuzek M., Lis R., Electric Power System Analysis in Matlab, Wroclaw University of Technology, 2007.
3. Kremens Z., Sobierajski M., Electric Power Analysis. WNT 1996 /in polish/

- Additional literature: An academic book on Electrical Power System Analysis.
- Conditions of the course acceptance/credition:

Laboratory - positive note of exercise reports, positive note of final test.

Examination - positive note of written and oral examination

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