DESCRIPTION OF THE COURSES

- Course code: ARR2505
- Course title: ELECTRIC POWER SYSTEM AUTOMATION
- Language of the lecturer: english, polish

Course form	***Lecture***	***Classes***	***Laboratory***	***Project***	***Seminar***
*Number of hours/week**	*2*		*1*		
*Number of hours/semester**	*30*		*15*		
Form of the course completion	*examination*		*exercise reports*		
ECTS credits	*5(3,2)*		*1*		
Total Student's Workload	*150*				

- Level of the course (basic/advanced): advanced
- Prerequisites: Programming in Matlab, Electric Power Systems
- 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: Robert Lis, Ph.D, Mirosław Łabuzek, PhD
- Year:.....1..... Semester:.....1.....
- Type of the course (obligatory/optional): obligatory
- Aims of the course (effects of the course): Knowledge of control and regulation of voltage and frequency in transient states
- Form of the teaching (traditional/e-learning): traditional
- Course description: Exciters and voltage regulators. Dynamic stability and power system stabilizers. Transient stability in multi-machine systems. FACTS and voltage control in transmission systems. Frequency control in modern power systems.
- Lecture:

Particular lectures contents	*Number of hours*
1. Computer advisory systems for transmission and distribution system operators.	*2*
2. Computer simulation of load flows.	*2*
3. Computer simulation of short-circuits.	*2*
4. Model of synchronous generator for the analysis of transient processes.	*2*
5. Modeling the connection of generator with network.	*2*
6. Voltage and frequency control of synchronous generators in power system.	*2*
7. Undumped rotor oscillation of synchronous generators.	*2*
8. Damping the rotor oscillations using power system stabilizers.	
9. Transient stability of generation unit with voltage and frequency regulation.	*7*
10. Modeling the transient states of hydrogenerator connected to power system.	*2*

11. Voltage stability - voltagew collapse. Models and mesure against instability. 12. Primary frequency control – modeling and analysis. 13. Secondary frequency regulation. 14. Frequency control in parallel power systems. 15. Modeling the isolated power systems.	*2* *2* *2* *2* *2* *2* *2*

- Classes – the contents:
- Seminars – the contents:
  1. Individual preparation of the power system diagram - per unit calculations.
  2. Computer simulation of load flows.
  3. Modeling voltage regulation in power network.
  4. Evaluation of dynamic stability by eigenvalue analysis.
  5. Analysis of transient stability by equal area method.
  6. Analysis of transient stability by numerical integration.
  7. Analysis of the impact the parameters of regulation on the power system stability.
- 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.
- Additional literature:

  3. Kremens Z., Sobierajski M., Electric Power Analysis. WNT 1996 /in polish/
- Conditions of the course acceptance/credition: Positive note of exercise reports, positive note of final examination.

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