DESCRIPTION OF THE COURSES

- Course code: ELR2568
- Course title: POWER SYSTEMS OPERATION AND CONTROL
- Language of the lecturer: polish

Course form	***Lecture***	***Classes***	***Laboratory***	***Project***	***Seminar***
*Number of hours/week**	*1*	*1*			
*Number of hours/semester**	*11*	*11*			
Form of the course completion	colloquium	colloquium			
ECTS credits	*1*	*1*			
Total Student's Workload	*30*	*30*			

- Level of the course (basic/advanced):
- Prerequisites: Electrical Power Systems
- Name, first name and degree of the lecturer/supervisor:
  Prof. Marian Sobierajski, Ph.D., D.Sc.
- Names, first names and degrees of the team's members:
  Mieczysław Biniek Ph.D.
  Robert Lis Ph.D.
  Mirosław Łabuzek Ph.D.
- Year:..... Semester:.....
- Type of the course (obligatory/optional): obligatory
- Aims of the course (effects of the course): Characteristic power system co-operation of large scale power system and power system regulation and control
- Form of the teaching (traditional/e-learning): traditional
- Course description: The modern electric power systems characteristics. Power system co-operation, a large scale power system analysis. Classification and characteristic of a power system operating condition (steady state, transient state). Power system regulation and control in various operating states. Power system frequency control. Frequency and load control in large and isolate interconnected power systems – mathematical model. Power system steady state – short-term load forecasting, fast load flow calculation methods, power systems optimization, fast security assessment methods, power systems reliability. Power system operation in transient states, modeling of power systems dynamics, the methods of power system security assessment.

- Lecture:

Particular lectures contents	*Number of hours*
1. Introduction to power system operation, the basic issues, main topics, requirements.	1
2. Characteristic of the modern electric power systems. Domestic power	1

systems comparison, large scale power systems. A power systems development tendency.	
3. The mathematical model of power system elements.	1
4. A characteristic of a power system steady state. Power flow studies. Fast power load flow calculation methods.	1
5. Power system frequency and load control systems. Power system co-operation rules. Primary frequency control - equations of state.	1
6. Secondary frequency control. Power system response for the large power system load disturbance. Power system load control - equations of state.	1
7. The mathematical model of power system stability. The criteria of local power system stability state.	1
8. The local power system stability state. The stability criteria of a two machine system.	1
9. The equal-area criterion. Mathematical model.	1
10. The integration method. Mathematical model.	2

- Classes – the contents:
  1. Linear models of the elements of electric power system.
  2. Fault and stability state models.
  3. Fault, admittance bus and reduce matrices
  4. The equal-area criterion. Step-by-step solution
  5. Colloquium
- Seminars – the contents:
- Laboratory – the contents:
- Project – the contents:
- Basic literature:

1. *Kremens Z., Sobierajski M., Analiza systemów elektroenergetycznych. Warszawa. WNT 1996*
2. Kacejko P., Machowski J., Zwarcia w sieciach elektroenergetycznych, WNT 1993
3. Kacejko P., Machowski J., Zwarcia w systemach elektroenergetycznych, WNT 2002
4. Kinsner K. i inni , Sieci elektroenergetyczne. Wrocław, Wyd. PWr, 1993

- Additional literature:
  An academic book on Electrical Power System Analysis
- Conditions of the course acceptance/credition:
  Lecture: positive note of colloquium; **Exercises:** positive note of colloquium

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