DESCRIPTION OF THE COURSES

- Course code: **ELR2265**
- Course title: **Control and regulation in electrical power systems**
- 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	Exam		Completion		
ECTS credits	3		1		
Total Student's Workload	90		30		

- Level of the course (basic/advanced): **basic**
- Prerequisites:
- Name, first name and degree of the lecturer/supervisor: **Wilhelm Rojewski, Ph.D.**
- Names, first names and degrees of the team's members:
  Witold Dzierżanowski, Ph.D.
- Year:....**I**./**Second degree/**........... Semester:..........**1**............
- Type of the course (obligatory/optional): **obligatory**
- Aims of the course (effects of the course): **understanding of principles and functions of control and regulation in power system**
- Form of the teaching (traditional/e-learning): **traditional**
- Course description:

   Description of power system as an object of management, control and regulation. Automatic control of turbine, generator and transformer. Complex regulation of active power and frequency (P-f) and reactive power and voltage (Q-U). Dispatcher control.

- Lecture:

Particular lectures contents	Number of hours
1. **Power system as an object of management, control and regulation. Structure and states of operation of power system.**	1.5
2. **Regulation of turbine. Static characteristic of controllers. Turbine control during transients.**	2
3. **Regulation of generator. Dispatcher diagram.**	2
4. **Excitation systems. Mathematical model of regulation sets. Operation of AVR during transients**	2
5. **Automatic transformer control. Under Load Tap Changer (ULTC).**	1.5
6. **Complex regulation of active power and frequency (P-f) and reactive power and voltage (Q-U) in power system**	1
7. **Dispatcher control. Telecommunication, telemetry and remote control in power system.**	1

- Classes – the contents:

- Seminars – the contents:
- Laboratory – the contents:
  1. **AVR of generator**
  2. **ULTC of transformer**
  3. **Synchronisation of generator**
  4. **Regulation of capacitor bank.**
- Project – the contents:
- Basic literature:
  1. **Machowski J., Bernas S., Stany nieustalone i stabilność systemu elektroenergetycznego, WNT, 1989.**
  2. **Machowski J., Bialek S., Bumby J.: Power system dynamics and stability. John Wiley and Sons 1998.**
  3. **Kremens Z., Sobierajski M., Analiza systemów elektroenergetycznych. Warszawa. WNT 1996**
  4. **Praca zbiorowa pod red. B. Synala, Automatyka elektroenergetyczna, ćwiczenia laboratoryjne. Cz. II, Układy automatyki zabezpieczeniowej i regulacyjnej, Wyd. PWr. 1991.**
  5. **Instrukcja ruchu i eksploatacji sieci przesyłowej (IRiESP), PSE SA. Internet.**
- Additional literature:
  1. **Kożuchowski J., Sterowanie systemami elektroenergetycznymi, PWN, 1994**
- Conditions of the course acceptance/credition: **Exam, completion of Lab**

* - depending on a system of studies