

## DESCRIPTION OF THE COURSES

- Course code: ELR2307
- Course title: Power Substations
- Language of the lecturer: polish

<i>Course form</i>	<i>Lecture</i>	<i>Classes</i>	<i>Laboratory</i>	<i>Project</i>	<i>Seminar</i>
<i>Number of hours/week*</i>	2				
<i>Number of hours/semester*</i>	30				
<i>Form of the course completion</i>	Exam				
<i>ECTS credits</i>	3(3)				
<i>Total Student's Workload</i>	90				

- Level of the course (basic/advanced): advanced
- Prerequisites: Electrical Devices 1 (ELR2301), Electrical Devices 2 (ELR2302)
- Name, first name and degree of the lecturer/supervisor: Waldemar Dołęga, Dr.
- Names, first names and degrees of the team's members: .Kazimierz Herlender, Dr. , Antoni Klajn, Dr.
- Year:.....I.(Second level study)..... Semester:.. 2.....
- Type of the course (obligatory/optional): obligatory
- Aims of the course (effects of the course): skills and competences: understanding of problems concerned power substations
- Form of the teaching (traditional/e-learning): traditional
- Course description:  
Introduction. Fundamental devices in power station. Sequence of devices in branch. Typical branches. Review of main power station schemes. Constructional solutions of power stations. Selection of apparatuses and devices in main power station circuits, examples of calculations. Transformers in power stations. Devices of AC and DC voltage supply in power stations. Power system protection and automatic switching. Signalling in power stations. Telecommunications for power system management. Measurements in power stations. Computer systems of supervision and management for power stations. Architectural foundations of power stations. Requirements of polish standards and rules.

- Lecture:

<i>Particular lectures contents</i>	<i>Number of hours</i>
<i>1. Introduction, fundamental definitions, classifications and requirements for power stations.</i>	2
<i>2. Typical solutions of branches.</i>	2
<i>3. Schemes of main power station circuits for busbars arrangements (schemes of contacts, advantages and disadvantages, range of using,</i>	3

<i>sequence of switch functions).</i>	
<i>4. Schemes of main power station circuits for systems without busbars (schemes of contacts, advantages and disadvantages, range of using, sequence of switch functions).</i>	2
<i>5. Typical schemes of substations (220 kV and 400 kV substaions, 110 kV substations, 20 kV substations).</i>	3
<i>6. Constructional solutions of power substations (indoor substations, outdoor substations, HV prefabricated substations,HV and LV switchgears.</i>	4
<i>7. Criteria of main circuits devices station selection (selection of switching devices, selection of current transformers and voltage transformers).</i>	2
<i>8. Power transformers (characteristic parameters and proprieties of transformers,selection of power transformers).</i>	2
<i>9. Devices of voltage supply in power stations (review of devices of voltage supply in power stations, feeding network arrangements of AC voltage supply, feeding network arrangements of DC voltage supply).</i>	4
<i>10. Power system protection and automatic switching (signalling in power stations, telecommunications for power system management, measurements in power stations).</i>	2
<i>11. Computer systems of supervision and management for power stations (system Syndis system Windex ,other systems).</i>	2
<i>12. Architectural foundations. General layout of power stations (indoor stations , outdoor stations).</i>	2

- Classes – the contents: isn't concerned
- Seminars – the contents: isn't concerned
- Laboratory – the contents: isn't concerned
- Project – the contents: isn't concerned
- Basic literature:
  1. Dołęga W.: Stacje elektroenergetyczne, Wydawnictwo Politechniki Wrocławskiej, Wrocław, 2007.
  2. Markiewicz H.: Urządzenia elektroenergetyczne, WNT, Warszawa, 2005.
  3. Praca zbiorowa: Poradnik inżyniera elektryka, Tom.2,3, WNT, Warszawa, 2005.
- Additional literature:
  1. Praca zbiorowa pod redakcją: W. Jabłońskiego: Sieci, instalacje i urządzenia elektroenergetyczne o napięciu powyżej 1kV. Poradnik inżyniera elektryka, projektanta i inwestora. Warszawa , Wydawnictwo Verlag Dashofer Sp.z.o.o., 2006.
  2. Praca zbiorowa pod redakcją S. Kujszczyka: Elektroenergetyczne sieci rozdzielcze. Tom 1, 2. Warszawa, Oficyna Wydawnicza Politechniki Warszawskiej 2005.
- Conditions of the course acceptance/creditation: positive result of the exam

\* - depending on a system of studies