

DESCRIPTION OF THE COURSES

- Course code: ELR2302
- Course title: Electrical devices 2
- 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>	1		2	1	
<i>Number of hours/semester*</i>	15		30	15	
<i>Form of the course completion</i>	Exam		completion of laboratory exercises	completion of the project task	
<i>ECTS credits</i>	3		2	1	
<i>Total Student's Workload</i>	90		60	30	

- Level of the course (basic/advanced): basic
- Prerequisites: Electrical devices 1
- Name, first name and degree of the lecturer/supervisor:
Zbigniew Wróblewski, prof. dr hab. inż.
- Names, first names and degrees of the team's members:
Henryk Markiewicz, prof. dr hab. inż.
Antoni Klajn, dr inż.
Kazimierz Herlender, dr inż.
Waldemar Dołęga, dr inż.
Mirosław Kobusiński, mgr inż.
- Year:.....3..... Semester:.....5.....
- Type of the course (obligatory/optional): obligatory
- Aims of the course (effects of the course):
Understanding of correlations between parameters and properties of electrical devices and power system operation. Know-how concerning proper design and effective operation of power electrical devices.
- Form of the teaching (traditional/e-learning): traditional
- Course description:
High voltage (HV) switches. Power transformers. Current and voltage transformers in electrical power substations. Over-voltage arresters and over-voltage protection of HV equipment. Limiting of short circuit currents. HV switchgears. Earthing in power electrical network. Basic configurations and constructional solutions of HV power substations. Protection against electric shock in HV devices. Auxiliary devices in high-voltage power substations. General operational rules of HV devices.
- Lecture:

<i>Particular lectures contents</i>	<i>Number of hours</i>
I. Classification of high-voltage switching apparatus. High-voltage power circuit breakers.	2

2. High voltage disconnecting and isolating switches, fuses, earthing and short-circuiting switches.	2
3. Power transformers. Parameters, principles of designing, operation conditions.	2
4. Current and voltage transformers in electrical power substations.	2
5. Over-voltage arresters. Limitation of fault currents. Short-circuit reactors.	2
6. Earthing in power electrical networks. High voltage switchgear.	2
7. Basic configurations of HV power substations circuits. Constructional solutions of HV power substations.	2
8. Auxiliary devices in high-voltage power substations. General operational rules of HV devices.	1

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

1. Introductory lecture.	2
2. Operating and short-circuit load of conductors.	2
3. Resistance of electrical contacts.	2
4. Electrical arc in DC and AC circuits.	2
5. Lighting technique and electrical light sources.	2
6. AC static switches.	2
7. Choosing of over-current protection of low-voltage motors.	2
8. Protection against electric shock with fast self-switching-off of supplying voltage. Testing of protection with residual current devices (RCD)	2
9. Testing of low-voltage power circuit breakers.	2
10. Contactor-control circuits of electrical motors.	2
11. Electrical installations in systems SI and IHC.	2
12. Low-voltage switchgears.	2
13. Switching operations in electrical power substations.	2
14. Additional practice for realisation of not completed exercises.	2
15. Completion of laboratory.	2

- Project – the contents:

Project task in the field of designing of electrical installations.

- Basic literature:

1. Markiewicz H. Urządzenia elektroenergetyczne. WNT, Warszawa 2005.
2. Bełdowski T., Markiewicz H.: Stacje i urządzenia elektroenergetyczne, WNT, Warszawa 1998.
3. Dołęga W., Klajn A., Kobusiński M.: Laboratorium z urządzeń i instalacji elektrycznych, Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław, 2004 (skrypt do laboratorium).

- Additional literature:

1. Markiewicz H.: Instalacje elektryczne. WNT, Warszawa 2006.
2. Maksymiuk J.: Aparaty elektryczne, WNT, Warszawa 1995.
3. Poradnik inżyniera elektryka, Tom 2 i 3, WNT, Warszawa 1996

- Conditions of the course acceptance/creditation:

Completion of examination, laboratory practice and the project task.

* - depending on a system of studies