

DESCRIPTION OF THE COURSES

- Course code: ELR1111
- Course title: Lightning protection
- Language of the lecturer: English

<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>	2				
<i>Total Student's Workload</i>	60				

- Level of the course (basic/advanced): basic
- Prerequisites: Mathematics, Electrotechnics. fundamentals
- Name, first name and degree of the lecturer/supervisor: Krystian Chrzan, Ph.D.
- Names, first names and degrees of the team's members:
- Year:..2..... Semester:.....3.....
- Type of the course (obligatory/optional): optional
- Aims of the course (effects of the course): Knowledge of lightning physics and lightning protection
- Form of the teaching (traditional/e-learning): traditional
- Course description:

Lightning protection provides information for the protection of buildings, electrical and electronic equipment and people from the effects produced by atmospheric discharges. The importance of lightning protection was increased last years due to miniaturization of electronic elements and their over voltage susceptibility. The lightning protection could be regarded now as a part of electromagnetic compatibility. The lecture contains the conventional lightning protection e.g. Franklin rod, potential equalization, surge arresters and non-conventional lightning protection (early streamer emission terminals).

- Lecture:

<i>Particular lectures contents</i>		<i>Number of hours</i>
1.	1. Introduction, the importance of lightning protection, atmospheric electricity, geomagnetic disturbances	2
2.	Thunderstorm formation, lightning classification, ball lightning, lightning research	2
3.	Lightning parameters, lightning interaction, lightning injuries, fires and destruction	2
4.	Protection zones, Franklin rods, ESE terminals	2
5.	Grounding problems and solutions, deep grounding, impulse resistance and dc resistance	2
6.	Measurement of grounding resistance	2
7.	Lightning protection for building structures, international	2

	standards	2
8.	Over voltages due to direct lightning stroke, induced over voltages	2
9.	Wave propagation in long lines	2
10.	Lightning protection for low voltage devices	2
11.	Lightning protection for transmission or distribution lines	2
12.	Gapped surge arresters, gapless surge arresters	2
13.	Selection of surge arresters, monitoring and diagnostics	
14.	Test	
15.	New solutions, computer programs, reports from the research	

- Classes – the contents:

- Seminars – the contents:

- Laboratory – the contents:

- Project – the contents:

- Basic literature:

Rakov V., Uman M. Lightning, physics and effects, Cambridge University Press 2005

Horvath T., Understanding Lightning and Lightning Protection, Wiley 2006

- Additional literature:

Chrzan K.L., Wysokonapiciowe ograniczniki przepiec, Dolnoslaskie Wydawnictwo Edukacyjne 2003

- Conditions of the course acceptance/creditation: Passed exam

* - depending on a system of studies