DESCRIPTION OF THE COURSES

- Course code: ELR1109
- Course title: HIGH VOLTAGE ENGINEERING 2
- Language of the lecturer: Polish

Course form	***Lecture***	***Classes***	***Laboratory***	***Project***	***Seminar***
*Number of hours/week**	*1*		*2*		
*Number of hours/semester**	*15*		*30*		
Form of the course completion	*exam*		*reports*		
ECTS credits	*2*		*2*		
Total Student's Workload	*60*		*60*		

- Level of the course (basic/advanced): basic
- Prerequisites: Materials engineering fundamentals, High Voltage Engineering 1. Name, first name and degree of the lecturer/supervisor: Janusz Fleszyński, professor D.Sc., B.Eng.
- Names, first names and degrees of the team's members:
  Adam Tymań, Ph.D, B.Eng.
  Krystian Chrzan, Ph.D, B.Eng.
  Maciej Jaroszewski, Ph.D, B.Eng.
  Krzysztof Wieczorek, Ph.D, B.Eng.
- Year:.II..... Semester:....4.....
- Type of the course (obligatory/optional): obligatory
- Aims of the course (effects of the course):
  Acquiring of basic knowledge, which is necessary for high voltage insulation design shills and maitenance of high voltage equipment and installation. Acquiring of practical skills in safe high voltage measurements und tests
- Form of the teaching (traditional/e-learning): traditional
- Course description:
  The course presents high voltage engineering problems from electrical power engineering needs point of view. Lectures are continuation of High Voltage Engineering 1 course and include following topics: electric strength of liquid and solid dielectrics, power cable and insulators, insulation systems of high voltage electric machines and high power transformers, lightning and overvoltage protection, rules of insulation coordination in power systems.
  The basic aim of laboratory tutorials is introduction into high voltage testing and measuring techniques
- Lecture:

Particular lectures contents	*Number of hours*
1. Electric strength of insulating liquids.	*2*
2. Electric strength of solid dielectrics.	*2*
3. Ageing processes in high voltage insulation.	*2*

4. Power cables and insulators.	*2*
5. Insulating systems of electric machines and high power transformers.	*2*
6. Devices and lightning and overvoltage protection.	*2*
7. Coordination of insulation in power system.	*2*
8. Introduction to high voltage test problems	*1*

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

Laboratory introduces into problems of high voltage testing and measurements techniques. It explains testing systems, basic methods of high voltage measuring and selected techniques of high voltage insulation testing. Tutorials are also experimental illustration of many topics presented during lectures, especially in the range of discharges development in air and electric strength of air insulation systems. During laboratory classes following are planed to be done:

1. Testing set-up of high alternating voltage.
2. Testing of wave propagation in model systems.
3. Generation and measuring of high dc voltage.
4. Electric strength of air at 50 Hz alternating voltage in uniform and weak uniform electric field.
5. Electric strength of air at 50 Hz alternating voltage in strong uniform electric field.
6. Surface electric strength of insulation systems in air at alternating voltage.
7. Measurements of dielectric losses, ionization voltage and partial discharges in insulating systems of high alternating voltage.
8. Voltage distribution on insulator chain.

- Project – the contents:
- Basic literature:
    1. Z. Flisowski, Technika Wysokich Napięć, WNT, Warszawa, 1999, 2005 Praca zbiorowa, Laboratorium wysokonapięciowe w dydaktyce i elektroenergetyce.
    2. Praca zbiorowa, Laboratorium wysokonapięciowe w dydaktyce i elektroenergetyce, J. Fleszyński (red.), Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław, 1999.
- Additional literature:
    1. Praca zbiorowa po redakcją Z. Pohla, Napowietrzna izolacja wysokonapięciowa, Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław, 2003.
    2. Praca zbiorowa po redakcją R. Kosztaluka, Technika badań wysokonapięciowych, t. 1, WNT, Warszawa, 1985.
    3. Praca zbiorowa po redakcją H. Mościckiej-Grzesiak, Inżynieria wysokich napięć w elektroenergetyce, Wydawnictwo Politechniki Poznańskiej, t.1 - 1996, t.2 - 1999.
- Conditions of the course acceptance/credition: All laboratory classes credited, lecture-related examination passed.

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