

DESCRIPTION OF THE COURSES

- Course code: ELR1208
- Course title: APPLIED ELECTROSTATICS
- 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>	<i>1</i>		<i>1</i>		
<i>Number of hours/semester*</i>	<i>15</i>		<i>15</i>		
<i>Form of the course completion</i>	<i>exam</i>		<i>reports</i>		
<i>ECTS credits</i>	<i>2</i>		<i>1</i>		
<i>Total Student's Workload</i>	<i>60</i>		<i>15</i>		

- Level of the course (basic/advanced): advanced.
- Prerequisites: General Physics, Fundamentals of Electrotechnics, Fundamentals of Materials Engineering.
- Name, first name and degree of the lecturer/supervisor: Ryszard Kacprzyk, D.Sc., Ph.D.
- Names, first names and degrees of the team's members:
 1. Edmund Motyl, D.Sc., Ph.D., B.Eng,
 2. Bożena Łowkis, Ph.D., B.Eng
- Year:....I..... Semester:....2.....
- Type of the course (obligatory/optional): obligatory
- Aims of the course (effects of the course):

Recognition of the physical nature of static electrification processes, hazards caused by static electricity and methods of their elimination. Recognition of modern technological applications of static electricity and measurement methods applied in electrostatics.

- Form of the teaching (traditional/e-learning): traditional
- Course description:

The lecture covers problemacy of practical application of laws and phenomena appearing in the field of electrostatics. Illustrates it's application in industrial processes, in agriculture, medicine, biology or environment protection. The special attention was paid on specific problems appearing in measurements and interpretation of obtained data. In the part associated with protection against static electricity, problems of electrical discharges in gases, ignition, hazards estimation and appropriate standarization were introduced. Special attention was also paid to the protection problems in electronic industry.

- Lecture:

<i>Particular lectures contents</i>	<i>Number of hours</i>
1. Fundamental concepts of electrostatics.	1
2. Electrification processes of solid and liquid bodies.	2
3. Fundamentals of measurements in electrostatics.	2
4. Electrostatic coating techniques (painting, flocking, spraying etc.).	1
5. Electrostatic separators.	1

6. Electro-filters.	1
7. Application of electrostatic phenomena in metrology nonelectric quantity.	1
8. Other applications of electrostatics (xerox process, electrospinning, ink jet and laser printers, electrostatic levitation, etc.).	1
9. Electrostatic hazards. Gas discharges.	2
10. Protection against electrostatic hazards in electronic industry.	1
11. Limitation of static electricity level. Antielectrostatic agents. Earthing.	1
12. Neutralization processes and neutralizers..	1

- Classes – the contents:

- Seminars – the contents:

- Laboratory – the contents:

Following 6 laboratory exercises should be done by students:

1. Experimental confirmation of basic laws of electrostatics.
2. Surface charge density measurements and related parameters.
3. Investigation of properties of antistatized materials and antistatic efficiency estimation.
4. Investigation of charge neutralizers.
5. Electret forming and evaluation their properties.
6. Investigation of the solid materials electrification process.

Two last hours of laboratory are predicted for improvements and credits .

- Project – the contents:

- Basic literature:

1. A. D. Moore (Ed.), *Electrostatics and its application*, J. Wiley & Sons, New York, 1973.
2. G. Luttigens, M. Glor, *Understanding and Controlling Static Electricity*, Springer Ver. 1989.
3. B. Hilczer, J. Małecki, *Elektrety i piezopolimery*, PWN, Warszawa, 1992.
4. J. Lutyński, *Elektrostatyczne odpylanie gazów*, WNT, Warszawa, 1965.
5. J. Simoroda, J. Staroba, *Elektryczność statyczna w przemyśle*, WNT, Warszawa, 1965.
6. Normy PN-E-05201, 05202, 05203, 05204.

- Additional literature:

- Conditions of the course acceptance/creditation: Laboratory: all exercises successfully done, lecture: passed exam.

* - depending on a system of studies