

**DOCTORAL SCHOOL OF WROCLAW UNIVERSITY OF SCIENCE AND  
TECHNOLOGY**

**SUPERVISOR/TEAM/ DECLARING/CONDUCTING COURSE:** Prof. Ryszard Kacprzyk  
**DEPARTMENT:** Faculty of Electrical Engineering W5  
**SCIENTIFIC DISCIPLINE:** Automation, Electronics and Electrical Engineering

**COURSE CARD**

**Course name in Polish:** Elektrostatyka stosowana  
**Course name in English:** Applied Electrostatics  
**Course language:** ~~Polish~~/English  
**University-wide general course type\*:**  
**The course is intended for all PhD students:** YES / NO

- ~~1) BASIC COURSE~~  
~~2) SPECIALIST COURSE~~  
~~3) SEMINAR~~  
~~4) HUMANISTIC COURSE~~  
~~5) LANGUAGE~~

**Subject code:** AEQ100235W

\* delete as applicable

	Lecture	Foreign language course	Seminar	Mixed forms
Number of hours of organized classes in university (ZZU)	30	-	-	-
Grading	Exam	Exam	Oral presentation	Exam, inspection, evaluation classes
Number of ECTS points	<b>0</b>			

**PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES**

1. Has knowledge of General Physics
2. Has knowledge of Materials Engineering Fundamentals
3. Knows basic concepts of Electrical Engineering, necessary for understanding of processes occurring in electrical fields.

**COURSE OBJECTIVES**

- C1 Acquisition of knowledge in the sphere of Electrostatics, necessary for understanding basic processes used in Electrostatic Modern Technologies, causing the specific Electrostatic Hazards, and in a sphere of the specific Electrostatic Measurements, necessary for their rational rating.
- C2 Acquisition of social competence associated mainly with cooperation in a student group, responsibility, honesty and proceeding reliability, obligatory in the academic environment.

**DOCTORAL SCHOOL OF WROCLAW UNIVERSITY OF SCIENCE AND  
TECHNOLOGY**

**PROGRAM CONTENTS**

<b>Form of classes – lecture (Lec)</b>		<b>Number of hours</b>
Lec1	Introduction: information on enter and credit requirements. Basic concepts in Electrostatics.	2
Lec2	Electrification processes in liquids and solids.	2
Lec3	Discharges in gases. ESD protection fundamentals.	2
Lec4	Basic concepts of ignition and explosion theories. ESD Hazards analysis with examples.	2
Lec5	Electrical charge dispersion. Grounding, antistatics and antistatization, neutralizers and neutralization.	2
Lec6	ESD protection in electronic industry	2
Lec7	Standards applied in ESD protection	2
Lec8	Electrostatic properties of materials and wares	2
Lec9	Electrostatic measurements and measuring devices. Interpretation of measurement results.	2
Lec10	Electro-filters (principle of operation, construction, properties and application)	2
Lec11	Electrostatic surface covering processes	2
Lec12	Electrostatic separators	2
Lec13	Electrets. Production, properties and application	2
Lec14	Electro-spinning (fundamentals, fibers properties, application)	2
Lec15	Other applications of Electrostatics	2
Total hours:		<b>30</b>

<b>Form of classes – foreign language course (Lng)</b>		<b>Number of hours</b>
Lng1		
Lng2		
Lng3		
..		
Total hours:		

<b>Form of classes – seminar (Sem)</b>		<b>Number of hours</b>
Sem1		
Sem2		
Sem3		
...		
Total hours:		

<b>Form of classes – mixed forms (mix)</b>		<b>Number of hours</b>
Mix1		
Mix2		
Mix3		
...		
Total hours		

**DOCTORAL SCHOOL OF WROCLAW UNIVERSITY OF SCIENCE AND  
TECHNOLOGY**

**TEACHING TOOLS USED**

N1. Lectures with application of slides.  
N2. Individual study  
N3. Consultations

**ACHIEVED SUBJECT LEARNING OUTCOMES**

Type of learning outcome	Code of learning outcome	Assessment of learning outcome
Knowledge	P8S_WG	Exam
Skills	P8U_U	Exam
Social competence	P8U_K	Exam

**PRIMARY AND SECONDARY LITERATURE**

**PRIMARY 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. Bubligen, 1989.  
[3] J. F. Hughes, Electrostatic Particle Charging. J. Wiley, NY. 1997.  
[4] A. G. Bailey, Electrostatic Spraying of Liquids, J. Wiley, NY. 1998.  
[5] B. Hilczer, J. Małecki, Elektry i piezopolimery, PWN, Warszawa, 1992.  
[6] O. J. McAteer, Electrostatic Discharge Control, McGraw-Hill Publ. Comp. N.Y, 1989.  
[7] J. M. Crowley, Fundamentals of Applied Electrostatics, J. Wiley & Sons, New York, 1986

**SECONDARY LITERATURE:**

- [1] G. M. Sessler (Ed.) Electrets, Springer Ver. Berlin, 1980/1989.  
[2] J. Lutyński, Elektrostatyczne odpylanie gazów, WNT, Warszawa, 1965.  
[3] J. Simoroda, J. Staroba, Elektryczność statyczna w przemyśle, WNT, Warszawa, 1965.  
[4] W. Lindmanowski, Zarys teorii wyładowań w dielektrykach, WNT, Warszawa, 1988.  
[5] A. Gajewski, Procesy i technologie Elektrostatyczne. PWN Warszawa-Kraków, 2000.  
[6] Z. Flisowski. Technika Wysokich Napięć. WNT, Warszawa, 2005.

**SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)**

Ryszard Kacprzyk, ryszard.kacprzyk@pwr.edu.pl