

FACULTY OF ELECTRICAL
ENGINEERING**SUBJECT CARD**

Name in Polish: **Podstawy elektrostatyki stosowanej**
 Name in English: **Fundamentals of applied electrostatics**
 Main field of study (if applicable): **Electrical Engineering**
 Specialization (if applicable):
 Level and form of studies: **1st level, full-time**
 Kind of subject: **optional**
 Subject code: **ELR051203**
 Group of courses: **NO**

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU):	30				
Number of hours of total student workload (CNPS):	90				
Form of crediting:	crediting with grade				
For group of courses mark (X) final course:					
Number of ECTS points:	3				
including number of ECTS points for practical (P) classes :					
including number of ECTS points for direct teacher-student contact (BK) classes:	2.10				

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Student has a general knowledge of physics
2. Student has a concepts in the area of electrical engineering necessary to explain and describe objects and phenomena relevant to electrostatics
3. Student has knowledge on fundamentals of materials engineering

SUBJECT OBJECTIVES

- C1. Acquisition of basic knowledge in applied electrostatics, necessary for phenomena understanding and rational description, and for hazards elimination (ESD)
- C2. Acquisition and consolidation of social skills including emotional intelligence skills involving the cooperation to effective problem solving. Responsibility, honesty and fairness in the procedure of academic community and society

SUBJECT LEARNING OUTCOMES*relating to knowledge:*

- PEU_W01 Student knows the physical phenomena and mechanisms appearing in electrostatics, methods of rational description of a charged object
- PEU_W02 Student has a basic knowledge in the range of ESD safety and electrostatic metrology

*relating to skills:**relating to social competences:*

- PEU_K01 Student is able to retrieve scientific information and critically analyze them

PROGRAMME CONTENT		
Form of classes - lecture		Number of hours:
Lec 1	Introduction (History, phenomena, hazards, application, subject organization))	2
Lec 2	Basic concepts and definitions	2
Lec 3	Electrification of liquids	2
Lec 4	Electrification of solids and powders	2
Lec 5	Electrical discharges in gases	2
Lec 6	Charge dissipation	2
Lec 7	Charge neutralization and neutralizers	2
Lec 8	ESD hazards	2
Lec 9	Quantities characterizing state of charged objects	2
Lec 10	Total charge and charge density measurements	2
Lec 11	Measurements of electric field intensity	2
Lec 12	Contactless measurements of potentials and voltages	2
Lec 13	Charge decay measurements	2
Lec 14	Standards and apparatus requirements	2
Lec 15	Test	2
Total hours:		30

TEACHING TOOLS USED
N1. Traditional lecture using a multimedia presentation and transparencies
N2. Accounting tasks - short 10 minutes written tests
N3. Consultations
N4. Student's own work

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT		
Evaluation <i>F - forming (during semester)</i> <i>P - concluding (at semester end)</i>	Educational effect number	Way of evaluating educational effect achievement
F1(w)	PEU_W01 PEU_W02 PEU_K01	Written tests
F2(w)	PEU_W01 PEU_W02 PEU_K01	Final test
P(w)	$P=0.4F1+0.6F2$	

PRIMARY AND SECONDARY LITERATURE
PRIMARY LITERATURE: [1] Gajewski A., Elektryczność statyczna, poznanie, pomiar, zapobieganie, eliminowanie. Instytut Wydawniczy Związków Zawodowych, Warszawa, 1987. [2] Clayton R. P., Introduction to Electromagnetic Compatibility, John Wiley & Sons, INC, 1992. [3] Charoy A., Zakłócenia w urządzeniach elektronicznych, t. 1-4, WNT, Warszawa 2000. [4] Kacprzyk R. Metody pomiarów w elektrostatyce, OWPW, Wrocław 2013.
SECONDARY LITERATURE: [1] Simoroda J., Staroba J., Elektryczność statyczna w przemyśle, WNT, Warszawa, 1965. [2] Normy: PN-E-05201, 05202, 05203, 05204. [3] Hilczer B., Małecki J., Elektrety i piezopolimery, PWN, Warszawa, 1992. [4] Luttigens G., Glor M., Understanding and Controlling Static Electricity, Springer Ver. 1989. [5] Moore A. D. (Ed.), Electrostatics and its application, J. Wiley & Sons, New York, 1973. [6] McAteer O. J., Electrostatic Discharge Control McGraw-Hill Publ. Comp. New York, 1989. [7] Cross J. A., Electrostatics, Principles, Problems and Applications, Adam Hilger, Bristol, 1987.

SUBJECT SUPERVISOR
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