

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: **ELR041203**  
 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 EDUCATIONAL EFFECTS***relating to knowledge:*

- PEK\_W01 Student knows the physical phenomena and mechanisms appearing in electrostatics, methods of rational description of a charged object
- PEK\_W02 Student has a basic knowledge in the range of ESD safety and electrostatic metrology

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

- PEK\_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:		<b>30</b>

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 EDUCATIONAL EFFECTS 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)	PEK_W01 PEK_W02 PEK_K01	Written tests
F2(w)	PEK_W01 PEK_W02 PEK_K01	Final test
P(w)	$P=0.4F1+0.6F2$	

PRIMARY AND SECONDARY LITERATURE
<b>PRIMARY LITERATURE:</b> [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.
<b>SECONDARY LITERATURE:</b> [1] Simoroda J., Staroba J., Elektryczność statyczna w przemyśle, WNT, Warszawa, 1965. [2] Normy: PN-E-05201, 05202, 05203, 05204. [3] Hilczek 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.

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MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT  
**ELR041203 - Fundamentals of applied electrostatics**  
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY **Electrical Engineering**

Subject educational effect	Correlation between subject educational effect and educational effects defined for main field of study and specialization (if applicable)	Subject objectives	Programme content	Teaching tool number
PEK_W01	K1ETK_ETP_W01	C.1	Lec1 Lec2 Lec3 Lec4 Lec5 Lec6 Lec7 Lec8 Lec9	N.1 N.2 N.3 N.4
PEK_W02	K1ETK_ETP_W01	C.1	Lec8 Lec9 Lec10 Lec11 Lec12 Lec13 Lec14	N.1 N.2 N.3 N.4
PEK_K01	K1ETK_K08	C.2	Lec1 Lec2 Lec3 Lec4 Lec5 Lec6 Lec7 Lec8 Lec9 Lec10 Lec11 Lec12 Lec13 Lec14 Lec15	N.1 N.2 N.3 N.4