

FACULTY OF ELECTRICAL  
ENGINEERING**SUBJECT CARD**

Name in Polish: **Technika wysokich napięć 1**  
 Name in English: **High voltage technology 1**  
 Main field of study (if applicable): **Electrical Engineering**  
 Specialization (if applicable):  
 Level and form of studies: **1st level, full-time**  
 Kind of subject: **obligatory**  
 Subject code: **ELR041101**  
 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:   | examination |         |            |         |         |
| 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**

- Has knowledge of the basics of materials engineering.

**SUBJECT OBJECTIVES**

- C1. Possession of basic knowledge needed for high-voltage insulation design and operation of high voltage power equipment.  
 C2. Acquisition of knowledge in the field of safe performance of high voltage test and measurement

**SUBJECT EDUCATIONAL EFFECTS***relating to knowledge:*

- PEK\_W01 Is able to explain phenomena determining electrical strength of dielectrics  
 PEK\_W02 Is able to explain phenomena appearing in high voltage systems and knows the measurement methods and evaluation them.

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

- PEK\_K01 The ability to think independently, search and analyze information.

**PROGRAMME CONTENT**

| Form of classes - lecture |   | Number of hours: |
|---------------------------|---|------------------|
| Lec 1                     | Introduction to the lecture. Basic definitions and notions. | 2                |
| Lec 2                     | Voltage exposures of insulation.                            | 2                |
| Lec 3                     | The electric field in the insulating systems                | 2                |
| Lec 4                     | Mechanisms of electrical discharges in gases.               | 2                |
| Lec 5                     | Electric strength of air and sulfur hexafluoride            | 2                |
| Lec 6                     | Surface discharges  | 2                |
| Lec 7                     | Electric strength of insulating liquids                     | 2                |
| Lec 8                     | Electric strength of solid dielectrics                      | 2                |
| Lec 9                     | High voltage equipment insulation systems.                  | 2                |
| Lec 10                    | Impulse strength, insulation coordination                   | 2                |
| Lec 11                    | Waveforms in transmission lines.                            | 2                |
| Lec 12                    | Surge protection equipment.                                 | 2                |
| Lec 13                    | High voltage test circuits                                  | 2                |
| Lec 14                    | Measurement of high voltages                                | 2                |
| Lec 15                    | Measurements of dielectric losses and partial discharges.   | 2                |
| Total hours:              |   | <b>30</b>        |

### TEACHING TOOLS USED

- N1. Conventional lecture  
N2. Individual work

### EVALUATION OF SUBJECT EDUCATIONAL EFFECTS ACHIEVEMENT

| Evaluation<br><i>F - forming (during semester)<br/>P - concluding (at semester end)</i> | Educational effect number     | Way of evaluating educational effect achievement |
|---|-------------------------------|--|
| F1(w)   | PEK_W01<br>PEK_W02<br>PEK_K01 | F1 - written exam                                |
| P(w)  | P=F1                          |  |

### PRIMARY AND SECONDARY LITERATURE

#### PRIMARY LITERATURE:

- [1] Z. Flisowski, Technika Wysokich Napięć, WNT, Warszawa, 1998 i wydania następne  
[2] Praca zbiorowa pod red. J. Fleszyńskiego, Laboratorium wysokonapięciowe w dydaktyce i elektroenergetyce, Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław, 1999.  
[3] Juchniewicz J., Lisiecki J., Wysokonapięciowe układy izolacyjne, skrypt PWr, 1980

#### SECONDARY LITERATURE:

- [1] Praca zbiorowa po redakcją Z. Pohla, Napowietrzna izolacja wysokonapięciowa, Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław, 2003.  
[2] Praca zbiorowa po redakcją H. Mościckiej-Grzesiak, Inżynieria wysokich napięć w elektroenergetyce, Wydawnictwo Politechniki Poznańskiej, t.1 - 1996, t.2 - 1999.  
[3] Praca zbiorowa po redakcją R. Kosztaluka, Technika badań wysokonapięciowych, t. 1, WNT, Warszawa, 1985.

### SUBJECT SUPERVISOR

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### MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT ELR041101 - High voltage technology 1 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_W10<br>K1ETK_W23  | C.1<br>C.2         | Lec1<br>Lec2<br>Lec3<br>Lec4<br>Lec5<br>Lec6<br>Lec7<br>Lec8   | N.1<br>N.2           |
| PEK_W02                    | K1ETK_W23   | C.1<br>C.2         | Lec9<br>Lec10<br>Lec11<br>Lec12<br>Lec13<br>Lec14<br>Lec15   | N.1<br>N.2           |
| PEK_K01                    | K1ETK_K09   | C.1<br>C.2         | Lec1<br>Lec2<br>Lec3<br>Lec4<br>Lec5<br>Lec6<br>Lec7<br>Lec8<br>Lec9<br>Lec10<br>Lec11<br>Lec12<br>Lec13<br>Lec14<br>Lec15 | N.1<br>N.2           |