FACULTY OF ELECTRICAL ENGINEERING

# SUBJECT CARD

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|---|---|
| Name in Polish: | **Elektryczne urządzenia zasilające małej mocy** |
| Name in English: | **Electrical Low Power Supplies** |
| Main field of study (if applicable): | **Electrical Engineering** |
| Specialization (if applicable): | **Industrial Electrical Engineering** |
| Level and form of studies: | **2nd level, part-time** |
| Kind of subject: | **optional** |
| Subject code: | **ELR041277** |
| Group of courses: | **NO** |

| | Lecture | Classes | Laboratory | Project | Seminar |
|---|---|---|---|---|---|
| Number of hours of organized classes in University (ZZU): | 22 | | | | |
| Number of hours of total student workload (CNPS): | 54 | | | | |
| Form of crediting: | crediting with grade | | | | |
| For group of courses mark (X) final course: | | | | | |
| Number of ECTS points: | 2 | | | | |
| including number of ECTS points for practical (P) classes : | | | | | |
| including number of ECTS points for direct teacher-student contact (BK) classes: | 1.40 | | | | |

## PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Student has a general knowledge of electronics

## SUBJECT OBJECTIVES

C1. The acquisition of knowledge in the principles of operation, construction and application of electrical low power supplies

C2. Acquisition and developing of social skills including emotional intelligence skills involving the cooperation to effective problem solving during team work

## SUBJECT EDUCATIONAL EFFECTS

*relating to knowledge:*

PEK_W01 Student knows the structure and properties of the basic components used in the power systems

PEK_W02 Student knows the principle of operation and properties and rules of power sources with a small power output

*relating to skills:*

*relating to social competences:*

PEK_K01 Student is able to act and to think independently and creatively

## PROGRAMME CONTENT

| | Form of classes - lecture | Number of hours: |
|---|---|---|
| Lec 1 | Introduction (Lecture program, credits conditions, literature). Passive components of power systems | 2 |
| Lec 2 | Low power chokes and transformers, selection of magnetic circuits | 2 |
| Lec 3 | Active components. Heat sources and cooling of components | 2 |
| Lec 4 | Rectifies | 2 |
| Lec 5 | Voltage multipliers | 2 |
| Lec 6 | AC/AC, DC/DC, DC/AC inverters and converters | 2 |
| Lec 7 | Linear dc stabilizers | 2 |
| Lec 8 | Impulse stabilizers of dc voltages | 2 |
| Lec 9 | Chemical electrical power sources | 2 |
| Lec 10 | Nowaday ctive components of energy converters and IC controlers | 2 |
| Lec 11 | Other electrical power sources (thermo-, photo-, piezo-elctrical). Energy harvesting. Test | 2 |
| | Total hours: | **22** |

| TEACHING TOOLS USED |
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| N1. Traditional lecture using a multimedia presentation<br>N2. Consultations<br>N3. Student's own work |

| EVALUATION OF SUBJECT EDUCATIONAL EFFECTS ACHIEVEMENT | | |
|---|---|---|
| **Evaluation**<br>*F – forming (during semester)*<br>*P – concluding (at semester end)* | **Educational effect number** | **Way of evaluating educational effect achievement** |
| F1(W) | PEK_W01<br>PEK_W02<br>PEK_K01 | Test |
| P(W) | P=F1 | |

| PRIMARY AND SECONDARY LITERATURE |
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| **PRIMARY LITERATURE:**<br>[1] Borkowski A, Zasilanie Urządzeń Elektronicznych, WKŁ, Warszawa, 1990.<br>[2] Kwaśniewski S. Stabilizatory napięcia. Dane, zastosowania. NEXT, Gdańsk, 1996.<br>[3] Czerwiński A., Akumulatory baterie i ogniwa. WKŁ, Warszawa, 2005.<br>[4] Beeby S., White N., Energy harvesting for autonomous systems, 2010, Artech House 685 Canton Street, Norwood, MA 02062.<br>**SECONDARY LITERATURE:**<br>[1] Brown M. ,Power Supply Cookbook. EDN Series for Design Eng. Newnes ButterworthHeinemann, 2001. |

| SUBJECT SUPERVISOR |
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| Ryszard Kacprzyk, ryszard.kacprzyk@pwr.edu.pl |

MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
**ELR041277 - Electrical Low Power Supplies**
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY **Electrical Engineering**
AND SPECIALIZATION **Industrial 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 | S2ETP_W12 | C.1 | Lec1<br>Lec2<br>Lec3<br>Lec10 | N.1<br>N.3 |
| PEK_W02 | S2ETP_W12 | C.1 | Lec4<br>Lec5<br>Lec6<br>Lec7<br>Lec8<br>Lec9<br>Lec11 | N.1<br>N.2<br>N.3 |
| PEK_K01 | K2ETK_K06 | 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 | N.1<br>N.2<br>N.3 |