FACULTY OF ELECTRICAL ENGINEERING

## SUBJECT CARD

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|---|---|
| Name in Polish: | **Regulacje prawne i inwestycje w energetyce o strukturze rozproszonej** |
| Name in English: | **Legal Regulations and Investments in Power Systems with Distributed Energy Sources** |
| Main field of study (if applicable): | **Electrical Engineering** |
| Specialization (if applicable): | **Renewable Energy Systems** |
| Level and form of studies: | **2nd level, full-time** |
| Kind of subject: | **obligatory** |
| Subject code: | **ELR052537** |
| Group of courses: | **NO** |

| | Lecture | Classes | Laboratory | Project | Seminar |
|---|---|---|---|---|---|
| Number of hours of organized classes in University (ZZU): | 30 | | | | 15 |
| Number of hours of total student workload (CNPS): | 60 | | | | 30 |
| Form of crediting: | crediting with grade | | | | crediting with grade |
| For group of courses mark (X) final course: | | | | | |
| Number of ECTS points: | 2 | | | | 1 |
| including number of ECTS points for practical (P) classes : | | | | | 1 |
| including number of ECTS points for direct teacher-student contact (BK) classes: | 1.40 | | | | 0.70 |

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

1. Knows the principles a power system operation and control, is familiar with electricity generation and transmission techniques.
2. Has sufficient range of language means at his/her disposal to relatively flawlessly speak out (orally and written), formulate and justify opinions, explain his/her position, show advantages and disadvantages of different solutions, participate in discussion and present general, scientific and technical subject matter.
3. Can use basic hardware and software, create and edit a text on basic level, create computer presentations.
4. Understands a need and knows possibilities of continuous education, increasing of professional, personal and social competences.
5. Has awareness of responsibility for own work.

### SUBJECT OBJECTIVES

C1. Getting to know national and union legal regulations in the field of utilization of renewable energy sources.
C2. Getting to know principles of well-balanced development.
C3. Possession a knowledge of energy and heat markets in aspect of renewable energy sources.
C4. Possession a knowledge of investment processes in renewable distributed generation.
C5. Acquisition of abilities to analyze legal, technical and economical aspects of construction of distributed and dispersed generation objects using renewable energy sources.
C6. Acquisition of abilities to design investments in distributed and dispersed generation.
C7. Acquisition of abilities to assess support mechanisms for investment of distributed and dispersed generation using renewable energy sources.

| SUBJECT LEARNING OUTCOMES | |
|---|---|
| *relating to knowledge:* | |
| PEU_W01 | Knows national and union legal regulations in the field of utilization of renewable energy sources. |
| PEU_W02 | Possession a knowledge of energy and heat markets in aspect of renewable energy sources. |
| PEU_W03 | Knows investment processes in renewable distributed generation. |
| *relating to skills:* | |
| PEU_U01 | Can analyze legal, technical and economical aspects of construction of distributed and dispersed generation objects using renewable energy sources. |
| PEU_U02 | Can design investments in distributed and dispersed generation. |
| PEU_U03 | Can assess support mechanisms for investment of distributed and dispersed generation using renewable energy sources. |
| *relating to social competences:* | |
| PEU_K01 | Can think and act in creative and enterprising way. He/she is able to rank appropriately the priorities needed for realizing the respective task. |

| PROGRAMME CONTENT | | |
|---|---|---|
| **Form of classes - lecture** | | **Number of hours:** |
| Lec 1 | The fundamentals of creating of legal regulations in the field of utilization of renewable energy sources. | 2 |
| Lec 2 | The Union legal regulations in the field of utilization of renewable energy sources (documents of the European Union). | 2 |
| Lec 3 | National legal regulations in the field of utilization of renewable energy sources (national documents). | 2 |
| Lec 4 | Review of legal regulations in area of renewable energy sources in selected countries of the European Union and in the world. | 2 |
| Lec 5 | Review of applied support mechanisms of development of renewable energy sources. | 2 |
| Lec 6 | National support mechanism in range of utilization of energy from renewable sources. | 2 |
| Lec 7 | Principles of well-balanced development and natural compensation and expansion of distributed and dispersed generation using renewable energy sources. | 2 |
| Lec 8 | Energy and heat markets in aspect of renewable energy sources. | 2 |
| Lec 9 | Formal and legal requirements for planning of construction of objects using renewable energy sources. | 2 |
| Lec 10 | Connection of renewable energy sources to the electric power grid. | 2 |
| Lec 11 | Formal and legal requirements connected with construction and modernization of power network infrastructure. | 2 |
| Lec 12 | Financial requirements for construction of objects using renewable energy sources. | 2 |
| Lec 13 | Preliminary study of investments using renewable energy sources in distributed generation. | 2 |
| Lec 14 | Example projects of investments in area of renewable energy sources. | 2 |
| Lec 15 | Test. | 2 |
| | Total hours: | **30** |

| **Form of classes - seminar** | | **Number of hours:** |
|---|---|---|
| Sem 1 | The Union legal regulations in the field of utilization of renewable energy sources. | 2 |
| Sem 2 | National legal regulations in the field of utilization of renewable energy sources. | 2 |
| Sem 3 | Formal and legal regulations for using renewable energy sources in different countries of the European Union. | 2 |
| Sem 4 | Support mechanisms for investment of distributed generation using renewable energy sources and electricity and heat markets. | 2 |
| Sem 5 | Completion of preliminary study of investment for selected objects of distributed generation using renewable energy sources. | 2 |
| Sem 6 | Guidelines for dealing with investors that plan to construct objects of distributed generation using renewable energy sources. | 2 |
| Sem 7 | Technological systems using renewable energy sources for the environment and legal regulations in this field. | 2 |
| Sem 8 | Repetition and summing up. | 1 |
| | Total hours: | **15** |

| TEACHING TOOLS USED | |
|---|---|
| N1. | Lecture with the use of audiovisual techniques, multimedia presentations. |
| N2. | Multimedia presentation. |
| N3. | Problem discussion. |
| N4. | Case study. |

| EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT | | |
|---|---|---|
| **Evaluation**<br>*F – forming (during semester)*<br>*P – concluding (at semester end)* | **Educational effect number** | **Way of evaluating educational effect achievement** |
| F1(W) | PEU_W01<br>PEU_W02<br>PEU_W03<br>PEU_K01 | Test. |
| P(W) | P=F1 | |
| F1(S) | PEU_U01<br>PEU_U02<br>PEU_U03 | Activity on seminar classes. |
| F2(S) | PEU_U01<br>PEU_U02<br>PEU_U03 | Preparing and presenting a presentation. |
| P(S) | P=0.2*F1+0.8*F2 | |

## PRIMARY AND SECONDARY LITERATURE

**PRIMARY LITERATURE:**

[1] Dyrektywa 2009/28/WE Parlamentu Europejskiego i Rady z dnia 23 kwietnia 2009 r. w sprawie promowania stosowania energii ze źródeł odnawialnych zmieniająca i w następstwie uchylająca dyrektywy 2001/77/WE oraz 2003/30/WE (Dz.Urz. WE L 140 z 5.06.2009).
[2] Dyrektywa 2009/72/WE Parlamentu Europejskiego i Rady z 13 lipca 2009 dotycząca wspólnych zasad rynku wewnętrznego energii elektrycznej i uchylająca dyrektywę 2003154/WE (Dz.U. UE L 211z 14.08.2009).
[3] Ustawa z dnia 10 kwietnia 1997 r. – Prawo Energetyczne (Dz. U. z 2006 r. Nr 89, poz. 625 z późn.zm.).
[4] Ustawa z dnia 20 lutego 2015 r. o odnawialnych źródłach energii (Dz. U. z 2015 r poz. 478).
[5] Kowalska A., Wilczyński A., Źródła rozproszone w systemie elektroenergetycznym. Wydawnictwo Kaprint, Lublin, 2007.
[6] Lewandowski W., Proekologiczne źródła energii odnawialnej. WNT, Warszawa, 2008.

**SECONDARY LITERATURE:**

[1] Rozporządzenia Ministra Gospodarki dotyczące funkcjonowania sektora elektroenergetycznego
[2] Boyle G., Renewable Energy – Power for a sustainable future, Second Edition, Oxford University Press Inc. New York, 2004.

## SUBJECT SUPERVISOR

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