

FACULTY OF ELECTRICAL  
ENGINEERING**SUBJECT CARD**

Name in Polish: **Mechanizmy rynkowe w energetyce o strukturze rozproszonej**  
 Name in English: **Market Mechanisms in Power Systems with Distributed Energy Sources**  
 Main field of study (if applicable): **Electrical Engineering**  
 Specialization (if applicable): **Control in Electrical Power Engineering**  
 Level and form of studies: **2nd level, full-time**  
 Kind of subject: **optional / university-wide**  
 Subject code: **ZMR032538**  
 Group of courses: **NO**

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU):	15				
Number of hours of total student workload (CNPS):	60				
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. Knows the principles a power system operation and control, is familiar with electricity generation and transmission techniques.
2. Has a basic knowledge in the field of renewable energy sources.
3. Understands a need and knows possibilities of continuous education, increasing of professional, personal and social competences.

**SUBJECT OBJECTIVES**

- C1. Possession a knowledge of function of electric energy sector including renewable energy sources.  
 C2. Getting to know market and regulatory mechanisms in power sector.  
 C3. Possession a knowledge of electric energy market.  
 C4. Possession a knowledge of goals of national and union energy policy.

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

- PEK\_W01 Knows function of electric energy sector including renewable energy sources.  
 PEK\_W02 Knows market and regulatory mechanisms in power sector.  
 PEK\_W03 Possesses a knowledge of electric energy market.

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

- PEK\_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	Specific features of energy supply sector. Evolution of structural forms - from vertical integration to restructuring and liberalization.	2
Lec 2	Mechanisms of energy market.	2
Lec 3	Regulation of energy market.	2
Lec 4	State' interventionism and market rules. Regulatory mechanisms on energy market.	2
Lec 5	Infrastructural multi-energy utilities.	2
Lec 6	Financial relations between market entities.	2
Lec 7	Realization of the European energy policy goals: effectiveness, use of renewable energy sources, counteraction of climate changes.	2
Lec 8	Test.	1
Total hours:		<b>15</b>

## TEACHING TOOLS USED

N1. Lecture with the use of audiovisual techniques, multimedia presentations.

## 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_W03 PEK_K01	Test.
P(w)	P=F1	

## PRIMARY AND SECONDARY LITERATURE

### PRIMARY LITERATURE:

- [1] Kowalska A., Wilczyński A., Źródła rozproszone w systemie elektroenergetycznym. Wydawnictwo Kaprint, Lublin, 2007.
- [2] Malko J. Wilczyński A., Rynki energii - działania marketingowe. Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 2006.
- [3] W.Joerss, M. Uytendlinde, P. Loeffler, P.E. Morthost, Decentralised Power Generation in the Liberalised EU Energy Markets, Springer-Verlag Berlin Heidelberg, 2003.
- [4] B. Murray, Power Markets and Economics: Energy Costs, Trading, Emissions, John Wiley and Sons Ltd. Chichester, England, 2009.

### SECONDARY LITERATURE:

- [1] M. Shahidehpour, H. Yamin, Zuyi Li, Market Operations in Electric Power Systems: Forecasting, Scheduling, and Risk Management, John Wiley and Sons Ltd. New York, 2002.
- [2] Czasopisma: Rynek Energii, IEEE Power & Energy, Power Engineering, Renewable Energy World.

## SUBJECT SUPERVISOR

Waldemar Dołęga, waldemar.dolega@pwr.edu.pl

MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT  
**ZMR032538 - Market Mechanisms in Power Systems with Distributed Energy Sources**  
 AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY **Electrical Engineering**  
 AND SPECIALIZATION **Control in Electrical Power 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	K2ETK_W06	C.1 C.4	Lec1 Lec2 Lec3 Lec4 Lec5 Lec6 Lec7 Lec8	N.1
PEK_W02	K2ETK_W06	C.2	Lec2 Lec3 Lec4 Lec8	N.1
PEK_W03	K2ETK_W06	C.3	Lec2 Lec3 Lec4 Lec5 Lec6 Lec8	N.1
PEK_K01	K2ETK_K03 K2ETK_K07	C.1 C.2 C.3 C.4	Lec1 Lec2 Lec3 Lec4 Lec5 Lec6 Lec7 Lec8	N.1