FACULTY OF ELECTRICAL ENGINEERING

SUBJECT CARD

Name in Polish:	**Gospodarka energetyczna**
Name in English:	**Energy management in energy systems**
Main field of study (if applicable):	**Electrical Engineering**
Specialization (if applicable):	**Electrical Power Engineering**
Level and form of studies:	**2nd level, part-time**
Kind of subject:	**obligatory**
Subject code:	**ELR042577**
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):	81				
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. Having basic knowledge of physical phenomena in electric energy generation and familiarity with basics electricity generation technologies
2. Having basic knowledge of economic and social costs of electricity production
3. Having basic knowledge of marketing and management in energy industry

SUBJECT OBJECTIVES

C1. Familiarizing with energy management assessment according to sustainable development rules
C2. Familiarizing with energy balance methods of energy technological systems and operation optimization of generating units
C3. Familiarizing with methods of initial economic analyses of technological systems for energy generation, transmission and utilizing
C4. Familiarizing with structure of energy system, its structural transformation and development trends

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:

PEK_W01 Has basic knowledge of energy balancing of technological systems for generation and utilizing of electricity, heat and cold and operation optimization of generation, transmission and distribution units

PEK_W02 Has basic knowledge of cost of generation of electricity, heat and cold

PEK_W03 Has basic knowledge of energy system, its structural transformation and development trends

relating to skills:

relating to social competences:

PEK_K01 Is aware of necessity of self-reliant information retrieval and creative using of obtained information

PROGRAMME CONTENT		
Form of classes - lecture		**Number of hours:**
Lec 1	Lecture introduction. Role of energy for civilization. Prividing energy demand. Structure of energy carriers using. Basic definitions in energy management	2
Lec 2	Energy system: definition and structure. Overview of national energy system and its development	2
Lec 3	Creating and using of energy characteristics	2
Lec 4	Creating and using of energy balances	2
Lec 5	Using optimization in energy management	2
Lec 6	Basic rules of economic analysis in energy management and its application	2
Lec 7	Basic rules for analysis of technical and economic efficiency of electricity and heat sources	2
Lec 8	Sustainable development principle. Direct and cumulative energy consumption. Improving energy efficiency	2
Lec 9	Structural transformations in energy system. Polish energy market operation	2
Lec 10	Energy policy. Development trends of polish energy industry. Energy security.	2
Lec 11	Final test	2
	Total hours:	**22**

TEACHING TOOLS USED
N1. Information lecture in form of multimedia presentation

EVALUATION OF SUBJECT EDUCATIONAL EFFECTS ACHIEVEMENT		
Evaluation *F – forming (during semester)* *P – concluding (at semester end)*	**Educational effect number**	**Way of evaluating educational effect achievement**
F1(W)	PEK_W01 PEK_W02 PEK_W03 PEK_K01	Writing test
P(W)	P=F1	

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] Charun H. Podstawy gospodarki energetycznej. Cz. 1, Wybrane zagadnienia dydaktyczne, Koszalin 2004.
[2] Paska J., Ekonomika w elektroenergetyce, OWPW, Warszawa 2007.
[3] Bartnik R., Rachunek efektywności techniczno-ekonomicznej w energetyce zawodowej, WPO Opole 2008.
[4] Dyka E., Mróz-Radłowska I., Ekonomia w energetyce - wybrane zagadnienia, Wyd. PŁ, Łódź 2014.
[5] Mejro Cz., Podstawy gospodarki energetycznej, WNT, Warszawa 1980.
[6] Gosztowt W., Gospodarka energetyczna w przemyśle, WNT, Warszawa 1973.

SECONDARY LITERATURE:

[1] Vanek, F. Albright L., Energy systems engineering : evaluation and implementation, McGraw-Hill, New York 2012.
[2] Ziebik A., Szargut J., Podstawy gospodarki energetycznej, Politechnika Śląska - Skrypty uczelniane, Gliwice 1995.
[3] Szargut, J., Ziębik, A. , Podstawy energetyki cieplnej, Wydawnictwo Naukowe PWN, Warszawa 1998.
[4] Chochowski A., Krawiec A. red.: , Zarządzanie w energetyce. Koncepcje, zasoby, strategie, struktury, procesy i technologie energetyki, Wydawnictwo Difin, Warszawa 2007.

SUBJECT SUPERVISOR

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MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT
ELR042577 - Energy management in energy systems
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY **Electrical Engineering**
AND SPECIALIZATION **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	S2EEN_W10	C.2	Lec3 Lec4 Lec5	N.1
PEK_W02	S2EEN_W10	C.3	Lec6 Lec7	N.1
PEK_W03	S2EEN_W10	C.1 C.4	Lec1 Lec2 Lec8 Lec9 Lec10	N.1
PEK_K01	K2ETK_K06	C.1 C.2 C.3 C.4	Lec1 Lec2 Lec3 Lec4 Lec5 Lec6 Lec7 Lec8 Lec9 Lec10 Lec11	N.1