

## COURSE GUIDE

<u>Subject name</u>	<b>Energy efficiency management</b>
<u>Course of study</u>	<b>Quality and Production Management</b>
<u>The form of study</u>	<b>Full-time</b>
<u>Level of qualification</u>	<b>First</b>
<u>Year</u>	<b>III</b>
<u>Semester</u>	<b>VI</b>
<u>The implementing entity</u>	<b>Department of Information Management Systems</b>
<u>The person responsible for preparing</u>	<b>dr hab. inż. Robert Kucęba, prof. PCz dr inż. Mariusz Pudło</b>
<u>Profile</u>	<b>General academic</b>
<u>ECTS points</u>	<b>2</b>

### TYPE OF TEACHING – NUMBER OF HOURS PER SEMESTER

<b>LECTURE</b>	<b>CLASS</b>	<b>LABORATORY</b>	<b>PROJECT</b>	<b>SEMINAR</b>
<b>15</b>	<b>15</b>	-	-	-

### COURSE AIMS

- C1. Presenting and discussing widely understood aspects concerning the methods of energy efficiency management such as, inter alia: sustainable development, innovative technologies of energy production and utilization, minimizing the cost of energy production.
- C2. Discussing and characterizing technological actions concerning energy efficiency including: thermal upgrading of buildings, eliminating the losses of energy transmission, possibilities of changing energy providers, reorganization of production processes, use of renewable energy in individual households and enterprises.

### ENTRY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Student can explain the principles of ecological and rational energy use.
2. Student can present economic principles of energy use reduction.
3. Student presents selected technological actions that influence energy use reduction.

### LEARNING OUTCOMES

- EU1. Student knows basic issues connected with energy security and energy efficiency with reference to sustainable development. Student can make use of them in the process of energy use optimization.
- EU2. Student knows the principles of energy audit construction and with the use of proper computer packages can prepare a building auditing aimed at optimizing the use of energy.
- EU3. Student knows methods of technological actions implementation concerning energy efficiency, in this, thermal upgrading of buildings, eliminating the losses of energy use transmission, possibilities of changing the energy provider.
- EU4. Student can estimate the costs incurred to improve energy efficiency and estimate the energy profit in cash equivalent.

### COURSE CONTENT

<b>Type of teaching – LECTURE</b>	<b>Number of hours</b>
W1. Introduction to the subject. Presenting basic issues and terms connected with methods of energy efficiency management.	1
W2. Aspect of sustainable development with reference to energy efficiency improvement: - analysis of ecological methods of implementing ventures that rationalise energy consumption, - analysis of technical and economic actions that rationalise energy consumption.	2
W3. Optimizing energy consumption through introduction of innovative technologies of	1

their use.	
W4. Cost reduction of energy acquisition with reference to various production sources.	1
W5. Influence of energy management with reference to individual households and enterprises.	1
W6. Presenting legal aspects concerning energy efficiency.	1
W7. Methods of conducting audits concerning electricity use among individual recipients and enterprises.	2
W8. Presenting technological actions concerning energy efficiency through: - thermal upgrading of buildings, - change of used energy sources and/or carriers with reference to various economic entities, - eliminating the losses of transmission and use of heat and electricity, - waste energy use, - possibility of selling the surpluses of produced energy, - monitoring the energy consumption, - possibility of changing the energy provider and making use of special tariffs, - reorganizing the production process, - using energy from renewable energy sources.	3
W9. Decision support in energy efficiency management.	1
W10. Procedures of acquiring resources from the pro-environmental actions funds.	1
W11. Methods of assessing the potential of local renewable energy sources.	1
W12. Managing energy efficiency in public utilities.	1
<b>Type of teaching - CLASS</b>	<b>Number of hours</b>
C1. Energy resources distribution in the world.	2
C2. Energy security - import and export structure.	2
C3. Energy efficiency of buildings, transport and enterprises.	2
C4. Economic market models - WILMAR, EPC-MACRO, COMPETES, EMELIE, SFE, AURORAxmp, EMCAS, PLEXOS, GTMax, UPLAN, WASP.	2
C5 Projecting energy consumption.	2
C6. Energy audit of a household.	2
C7. Energy audit in public utilities.	2
C8. Test.	1

### TEACHING TOOLS

- Books, press articles, multimedia presentations, Internet, valid law regulations, energy audits, economic maps, computer packages GRETL, Statistica.
- Computers and multimedia projector.

### WAYS OF ASSESSMENT (F – FORMATIVE, P – SUMMATIVE)

- F1. Current assessment of Student's activeness.  
F2. Assessment of creativity in group works, formulating new solutions.  
P1. Control tests checking the teaching outcomes at particular stages of education.

### STUDENT WORKLOAD

Form of activity		Average number of hours for performing an activity		
		[h]	ECTS	ECTS
Contact hours with the teacher	Lecture	15	0.6	0.68
Preparation to the test		2	0.08	
Contact hours with the teacher	Laboratory	15	0.6	0.72
Preparation to the exercises		3	0.12	
Getting acquainted with the indicated literature		5	0.2	0.2

Consultation	10	0.4	0.4
<b>TOTAL NUMBER OF HOURS / ECTS POINTS FOR THE COURSE</b>	<b>50</b>	<b>2</b>	

## BASIC AND SUPPLEMENTARY RESOURCE MATERIALS

### Basic resources

1. Kucęba R., Zawada M., Szajt M., Kowalik J. Prosumer Energy as a Stimulator of Micro- Smart Grids Development - on the Consumer Side. 2nd International Conference on Energy and Environmental Science (ICEES 2018), Kuala Lumpur, Malezja, 2018.
2. Kucęba R. Virtual power plant. Chosen aspects of organizing and managing dispersed generation subjects. Toruń: TNOiK „Dom Organizatora“ 2011. 278 p. ISBN 978- 83-7285-600-5.
3. Niedziółka D. Green Energy in Poland. CeDeWu.pl, Warszawa 2012.
4. Popczyk J. Distributed Energy. PKEOM, Warszawa 2011.

### Supplementary resources

1. Malko J. Wybrane zagadnienia prognozowania w elektroenergetyce. Politechnika Wrocławska, Wrocław 1995.
2. Polityka energetyczna Polski do 2030 roku - Dokument przyjęty przez Radę Ministrów w dniu 10 listopada 2009 roku, Ministerstwo Gospodarki, Warszawa, 10 listopada 2009.
3. Rynek Energii, czasopismo, Wydawnictw Kaprint, Lublin.
4. Legal acts - directives, resolutions and laws.

## TEACHERS (NAME, SURNAME, E-MAIL ADDRESS)

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## MATRIX OF LEARNING OUTCOMES REALISATION

Learning outcome	Reference of given outcome to outcomes defined for whole program (PRK)	Course aims	Course content	Teaching tools	Ways of assessment
EU1	K_W01, K_W02, K_W07, K_W09, K_W10, K_U01, K_U02, K_U03, K_K02, K_K04,	C1, C2	W1-W4, W10 C1, C2,	1, 2	F1, F2, P1
EU2	K_W02, K_U01, K_U02, K_U04, K_U07, K_U08, K_U09, K_U10, K_K02	C2	W5-W7, W9, W11, C4, C6, C7	1,2	F1, F2, P1
EU3	K_W01, K_W02, K_W03, K_U09	C1,C2	W8, W12 C3, C5	1, 2	F1, F2, P1
EU4	K_W02, K_U01, K_U02, K_U04, K_U07, K_U08, K_U09, K_U10, K_K02	C1,C2	W7, W9, W11 C4, C6, C7	1, 2	F1, F2, P1

## FORM OF ASSESSMENT - DETAILS

	grade 2	grade 3	grade 4	grade 5
EU1	Student does not know basic issues connected with energy security and energy efficiency with reference to sustainable development. Student cannot make use of them in the process of energy use	Student knows basic issues connected with energy security and energy efficiency with reference to sustainable development. Student can make use of them in the process of energy use optimization.	Student knows basic issues connected with energy security and energy efficiency with reference to sustainable development. Student can make use of them in the process of energy use optimization. Student can indicate basic directions of	Student knows basic issues connected with energy security and energy efficiency with reference to sustainable development. Student can make use of them in the process of energy use optimization. Student can indicate basic directions of export and import of

	optimization.		export and import of energy resources. Student knows their world distribution.	energy resources. Student knows their world distribution. Student can determine energy efficiency of buildings and selected means of transport.
<b>EU2</b>	Student does not know the principles of energy audit construction and with the use of proper computer packages can prepare a building auditing aimed at optimizing the use of energy.	Student knows the principles of energy audit construction and with the use of proper computer packages can prepare a building auditing aimed at optimizing the use of energy.	Student knows the principles of energy audit construction and with the use of proper computer packages can prepare a building auditing aimed at optimizing the use of energy Student can prepare information indispensable for its construction.	Student knows the principles of energy audit construction and with the use of proper computer packages can prepare a building auditing aimed at optimizing the use of energy Student can prepare information indispensable for its construction. Student can prepare audit of the building with the use of proper computer packages.
<b>EU3</b>	Student does not know methods of technological actions implementation concerning energy efficiency, in this, thermal upgrading of buildings, eliminating the losses of energy use transmission, possibilities of changing the energy provider.	Student knows methods of technological actions implementation concerning energy efficiency, in this, thermal upgrading of buildings, eliminating the losses of energy use transmission, possibilities of changing the energy provider.	Student knows methods of technological actions implementation concerning energy efficiency, in this, thermal upgrading of buildings, eliminating the losses of energy use transmission, possibilities of changing the energy provider. Student can calculate losses resulting from resources applied in construction.	Student knows methods of technological actions implementation concerning energy efficiency, in this, thermal upgrading of buildings, eliminating the losses of energy use transmission, possibilities of changing the energy provider. Student can calculate losses resulting from resources applied in construction. Student can conduct actions connected with changing the provider.
<b>EU4</b>	Student cannot estimate the costs incurred to improve energy efficiency and cannot estimate the energy profit in cash equivalent.	Student can estimate the costs incurred to improve energy efficiency and cannot estimate the energy profit in cash equivalent.	Student can estimate the costs incurred to improve energy efficiency and estimate the energy profit in cash equivalent.	Student can estimate the costs incurred to improve energy efficiency and estimate the energy profit in cash equivalent. Student know good practice.

#### **ADDITIONAL USEFUL INFORMATION ABOUT THE COURSE**

1. Information where presentation of classes, instruction, subjects of seminars can be found, etc. - presented to students during first classes, if required by the formula classes are sent electronically to the e-mail addresses of individual dean groups.

2. Information about the place of classes - Information can be found on the website of the Faculty of Management.
3. Information about the timing of classes (day of the week / time) - Information can be found on the website of the Faculty of Management.
4. Information about the consultation (time + place) - Information can be found on the website of the Faculty of Management.