



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Energy efficiency

### Course

Field of study

Electrical power engineering

Area of study (specialization)

-

Level of study

Second-cycle studies

Form of study

part-time

Year/Semester

2/4

Profile of study

general academic

Course offered in

polish

Requirements

compulsory

### Number of hours

Lecture

10

Laboratory classes

0

Other (e.g. online)

0

Tutorials

0

Projects/seminars

10

### Number of credit points

2

### Lecturers

Responsible for the course/lecturer:

Jerzy Andruszkiewicz, Ph. D., Eng.

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Responsible for the course/lecturer:

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### Prerequisites

Basic knowledge in electrical engineering, electrical power engineering and operation of the energy markets. Ability to analyse the operation of devices and elements of transmission systems, determine energy consumption and energy losses in both receivers and elements of the power grid. Awareness of the need to extend professional, personal and social competences. Willingness to critically assess the knowledge and its importance in solving analytical and practical problems.

### Course objective

The aim of the course is to learn the methods and activities implemented in the energy economy for a better use of natural energy resources as well as improvements in energy generation and transmission by



implementing energy efficiency measures. Understanding the legal requirements and achievements in implementing energy efficiency.

### Course-related learning outcomes

#### Knowledge

1. Student has extended knowledge of energy efficiency improvement measures as well as technical and economic methods of evaluating energy efficiency projects
2. Student has knowledge of legal requirements regarding the implementation of the obligation to increase energy efficiency.

#### Skills

1. Student is able to make a technical, economic and ecological evaluation of energy efficiency projects.
2. Student is able to make a critical analysis of the performance of technical solutions in the field of energy management implemented by energy companies and to predict the effects of such actions.

#### Social competences

1. Student is aware of the need to increase energy efficiency for the proper operation of the power system and environmental protection.

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

#### Lecture:

- knowledge and skills assessment through a problem-based written test,
- continuous assessment of student's skills and competences during each class (rewarding attendance and active participation in the classes).

#### Project:

- assessment of the knowledge and skills concerning the project tasks, evaluation of the project report,
- suggestion and evaluation of energy efficiency measures with a particular methodology.

### Programme content

#### Lecture:

Energy efficiency of different economy sectors, energy efficiency legal regulations, energy efficiency of buildings, national energy efficiency action plan in Poland, energy efficiency implementation management. Energy efficiency and energy saving indicators, energy labelling, improving the efficiency of electricity use. White certificates scheme, energy efficiency audit, enterprise energy audit, energy management systems.

#### Project:



Improvement of energy efficiency and its economic consequences in terms of household electricity consumption. Energy efficiency and energy saving indicators. Improving energy efficiency in industrial plants in terms of electricity and heat consumption.

### Teaching methods

Lecture: multimedia presentation - informational and problem lectures

Project: individual project tasks related to adjusting energy efficiency measures for residential or industrial electricity consumers

### Bibliography

#### Basic

1. Billewicz K., Smart metering: inteligentny system pomiarowy, Wydawnictwo Naukowe PWN, Warszawa 2012
2. Górzyński J., Efektywność energetyczna w działalności gospodarczej, Wydawnictwo Naukowe PWN, Warszawa 2017
3. Wąchocki R., Efektywność energetyczna budynków: przepisy z komentarzem, POLCEN 2015

#### Additional

1. Andruszkiewicz J., Lorenc J., Warunki wdrożenia w Polsce cenowych programów sterowania popytem dla ograniczenia szczytowego zapotrzebowania na energię elektryczną, Przegląd Elektrotechniczny - 2014, nr 8, s. 97-100
2. Bielecki S., Zaleski P., Fortuński B., Wybrane problemy zarządzania energetyką, Texter, Warszawa 2016
3. Efektywność wykorzystania energii w latach 2007-2017, Opracowanie GUS 2019
4. EU Energy Efficiency Directive 2012/27/EU
5. Krajowy Plan Działań dotyczący efektywności energetycznej dla Polski 2017, Ministerstwo Energii 2017
6. Ustawa z dnia 20 maja 2016 r. o efektywności energetycznej (Dz.U. 2016 poz. 831) z późniejszymi zmianami



### Breakdown of average student's workload

|  | Hours | ECTS |
|--|-------|------|
| Total workload   | 50    | 2,0  |
| Classes requiring direct contact with the teacher  | 20    | 1,0  |
| Student's own work (literature studies, preparation for classes, preparation for test, project preparation) <sup>1</sup> | 30    | 1,0  |

<sup>1</sup> delete or add other activities as appropriate