



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Rational energy management and demand side response

Course

Field of study

Power Engineering

Area of study (specialization)

Sustainable development of power engineering

Level of study

Second-cycle studies

Form of study

part-time

Year/Semester

2/3

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:

mgr inż. Agnieszka Weychan

email: agnieszka.weychan@put.poznan.pl

tel. 61 665 2392

Faculty of Environmental Engineering and

Energy

Piotrowo 3A, 60-965 Poznań

Responsible for the course/lecturer:

dr hab. inż. Jarosław Gielniak

email: jaroslaw.gielniak@put.poznan.pl

tel. 61 665 2024

Faculty of Environmental Engineering and

Energy

Piotrowo 3A, 60-965 Poznań

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 assess the knowledge critically 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 energy generation and transmission by implementing energy efficiency measures and managing electricity demand. Understanding the advancements in implementing energy efficiency measures and demand side management and their supporting systems.



Course-related learning outcomes

Knowledge

1. Student has extended knowledge on energy efficiency improvement measures and demand side response programs as well as their supporting systems.
2. Student has knowledge on the goal of energy efficiency measures and demand side response programs.
3. Student has knowledge about data acquisition systems for electricity consumption and computer-aided calculation methods in the energy sector.

Skills

1. Student is able to assess energy efficiency projects in terms of economic viability.
2. Student is able to critically analyze the operation of existing technical solutions for energy management and evaluate these solutions.
3. Student is able to analyse the operation of the elements of the power system using mathematical tools.

Social competences

1. Student can think and act in a creative and cost-effective way in the field of energy efficiency solutions.

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,
- preparation and presentation of energy efficiency or demand response 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, classification of demand response programs, incentive or tariff-based demand management programs, the most popular demand side response programs in Poland, energy efficiency implementation management. Energy efficiency and energy saving indicators, energy labelling, improving the efficiency of electricity use, profitability of tariff program changes, elasticity of electricity demand, demand response programs used by power system operators.



Project:

Profitability of changing tariff for electricity settlement. Improving energy and economic efficiency in terms of household electricity consumption. Energy efficiency and energy saving indicators.

Teaching methods

Lecture: multimedia presentation - informational and problem lectures

Project: individual project tasks related to adjusting energy efficiency measures for residential 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, r. 90 nr 8/2014, 97-10
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. Krajowy Plan Działań dotyczący efektywności energetycznej dla Polski 2017, Ministerstwo Energii 2017
5. 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	60	2,0
Classes requiring direct contact with the teacher	25	1,0
Student's own work (literature studies, preparation for classes and tests, solving project task) ¹	35	1,0

¹ delete or add other activities as appropriate