



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Energy management and renewable sources of energy

### Course

Field of study

Chemical and process engineering

Area of study (specialization)

Level of study

First-cycle studies

Form of study

full-time

Year/Semester

4/7

Profile of study

general academic

Course offered in

Polish

Requirements

compulsory

### Number of hours

Lecture

30

Laboratory classes

Other (e.g. online)

Tutorials

Projects/seminars

### Number of credit points

3

### Lecturers

Responsible for the course/lecturer:

dr hab. Małgorzata Osińska

malgorzata.osinska@put.poznan.pl

WTCh, ul. Berdychowo 4, 61-131 Poznań

Responsible for the course/lecturer:

dr inż. Paweł Jeżowski

pawel.jezowski@put.poznan.pl

WTCh, ul. Berdychowo 4, 61-131 Poznań

### Prerequisites

The basic knowledge within mathematics and physical chemistry

Student understands the need for continuous training and improve his professional and personal competences

### Course objective

Gaining knowledge in term of conventional energy and environmentally friendly renewable energy sources.

### Course-related learning outcomes

Knowledge

Student knows the principles of environmental engineering related to chemical production and waste management [K\_W08].



### Skills

Able to use the principle of saving raw materials and energy, and by modernizing equipment and processes is achieved favorable economic indicators and reduce the environmental burden [K\_U14].

### Social competences

Understands the need for continuous training and improve his professional and personal competences - [K\_K01].

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The knowledge acquired during the lecture is verified by a written test consisting of 10 to 30 test questions and/or several open questions. Passing threshold: 51% of the maximum number of points.

### Programme content

1. Conventional energy and methods of reduce the risks associated with this type of energy
2. Water, wind, solar and geothermal energy
3. Biomass and biogas as a renewable energy sources
4. Hydrogen as an energy carrier
5. Electrochemical energy

### Teaching methods

Lecture

### Bibliography

Basic

1. W.M. Lewandowski, Proekologiczne odnawialne źródła energii, WNT, W-wa 2013
2. A. Czerwiński, Ogniwa, akumulatory, baterie, Wydawnictwa Komunikacji i łączności, W-wa 2012.

Additional

R. Arnowski, W.M. Lewandowski, Technologie ochrony środowiska w przemyśle i energetyce, WNT, W-wa 2020.

### Breakdown of average student's workload

	Hours	ECTS
Total workload	60	3,0
Classes requiring direct contact with the teacher	35	3,0
Student's own work (literature studies, preparation for test) <sup>1</sup>	25	3,0

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