



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Environment protection in power engineering [N1Energ2>OŚwE]

### Course

Field of study

Power Engineering

Year/Semester

4/7

Area of study (specialization)

–

Profile of study

general academic

Level of study

first-cycle

Course offered in

Polish

Form of study

part-time

Requirements

compulsory

### Number of hours

Lecture

20

Laboratory classes

0

Other (e.g. online)

0

Tutorials

10

Projects/seminars

0

### Number of credit points

3,00

### Coordinators

dr inż. Artur Bugała

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### Lecturers

### Prerequisites

Basic knowledge in the field of electricity generation, knowledge of energy objects included in the power system, their construction and purpose. Ability to analyze the course of electricity generation processes.

### Course objective

The aim of the course is to familiarize students with: - rules for organizing electricity generation processes and the use of technologically adapted devices for environmental protection, - the impact of individual electricity generation technologies on the natural environment, - methods to reduce the impact of generation on the state of the environment.

### Course-related learning outcomes

Knowledge:

1. Student is able to determine the impact of processing various types of solid, liquid and gaseous energy fuels on the natural environment.
2. Student is able to characterize the basic technologies included in renewable energy, the use of which is an alternative to conventional generation.
3. Student is able to analyze and calculate the emission of gaseous and dust pollutants, resulting from

the implementation of electricity and heat production processes by various methods.

#### Skills:

The student has the ability to design and analyze the work of simple installations and technological lines intended to reduce the emission of harmful chemical compounds to the natural environment.

The student is able to use legal documentation regarding environmental requirements, including directives, norms and laws.

#### Social competences:

The student understands that knowledge and skills in the field of environmental protection require continuous improvement and updating with new technologies.

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Knowledge acquired during the lecture is verified at the colloquium carried out during the 15th lecture.

The test consists of 15 test questions and 5 open questions, scored differently. The pass mark is 50% of the total number of points.

Skills acquired as part of the tutorials are verified on the basis of a final test, consisting of 5 tasks with various points, depending on their level of difficulty. The pass mark is 50% of the total number of points.

### Programme content

The program covers the issues of reducing atmospheric air pollution, biofuels and bioelectromagnetism.

### Course topics

lecture:

- unconventional methods of generating electricity,
- atmospheric air protection, water and soil protection,
- legal requirements to limit excessive noise of power equipment,
- furnace waste transport and storage technologies,
- measurements of environmental pollution,
- biohydrogen as an alternative fuel,
- 1st and 2nd generation biofuels,
- impact of the electromagnetic field of technical objects on humans.

exercises:

- calculation of gaseous and dust emissions,
- calculation of the effective amount of the emission source,
- sozological analysis of the efficiency of waste gas cleaning devices,
- calculations regarding the selected technology in the field of renewable energy sources (heat pump, solar collector).

### Teaching methods

lecture: multimedia presentation (including drawings, photos, animations, sound, films) supported by examples given on the board.

exercises: performing calculation tasks using a blackboard, given by the teacher. Detailed reviewing of task solutions by the teacher and group discussions.

### Bibliography

Basic:

1. Kucowski J., Laudyn D., Przekwas M.: Energetyka a ochrona środowiska, WNT, 1994.
2. Krystek J.: Ochrona środowiska dla inżynierów, Wydawnictwo Naukowe PWN, 2018.
3. Lewandowski M., Ryms M.: Biopaliwa, Proekologiczne odnawialne źródła energii, WNT, 2013.

Additional:

1. Paska J.: Wytwarzanie energii elektrycznej, Oficyna Wydawnicza PW, Warszawa 2005.
2. Laws, regulations and norms

## Breakdown of average student's workload

	Hours	ECTS
Total workload	80	3,00
Classes requiring direct contact with the teacher	30	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	50	2,00