COURSE DESCRIPTION CARD - SYLLABUS

Course name
Environmental engineering [S2ZE1E>OŚ]

Course

Field of study
Green Energy

Year/Semester
1/1

Area of study (specialization)
–

Profile of study
general academic

Level of study
second-cycle

Course offered in
english

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
15

Laboratory classes
0

Other (e.g. online)
0

Tutorials
0

Projects/seminars
0

Number of credit points

1,00

Coordinators

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Lecturers

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Prerequisites

Student has basic knowledge of thermodynamics, electrical engineering, mathematics and biology and knowledge about knowledge of the surrounding environment and the construction of power machines. Student should also have skills to solve engineering problems with the use of scientific methods and find relevant information in literature, on the Internet, in data bases, and in other sources.

Course objective

To acquaint students with the knowledge and analysis of the problems of environmental protection in energy industry as well as in renewable energy industry.

Course-related learning outcomes

Knowledge:
Knows the main directions of development of the energy industry, taking into account environmental norms and binding standards of emission of toxic compounds, and electric and magnetic fields.

The student is familiar with the negative impact of energy technologies, energy and electric power networks on the environment and knows methods of mitigating these effects.
The student knows main development trends in the field of environmentally friendly energy and electric power technologies

Skills:
Is able to notice systemic and non-technical aspects, including ethical ones when formulating and solving engineering tasks in the field of electric power engineering, industrial and renewable energy related to environment protection.
Is able to critically analyze the functioning of existing technical solutions in the energy industry and evaluate these solutions in terms of environmental impact.
Is able to lead a debate in the field of shaping knowledge on topics related to environmental protection.

Social competences:
Is ready to recognize the importance of knowledge in solving cognitive and practical problems and to seek expert opinions in the event of difficulties in solving the problem yourself.
He is ready to fulfill social obligations, inspire and organize activities for the social environment.
He is ready to critically assess his knowledge and received content, also in terms of the impact of technology on the natural environment.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture - the written examination. The evaluation of student knowledge will be held based on an answers on 5 questions from the material presented during the lectures.

Programme content

Lecture: Formation of toxic components and pollutants during combustion process, high efficiency and low emission combustion gas technology, alternative fuel gases, regulations on environmental protection, methods of destruction process of VOC, flameless combustion, primary and secondary methods of reduction of toxic compounds during the combustion processes, zonal volumetric combustion, emission from agriculture, local emission, economical and ecological impact of investment on environmental. Allowable values of electric, magnetic field stress and power density in Poland and on the world. Negative impacts of the fields on people. Methods of field reduction, used in case of overhead high voltage lines.

Teaching methods

Lecture: multimedia presentation, illustrated with examples on the board.

Bibliography

Basic:
John C. Mycock: Handbook of air pollution control engineering and technology
Hiroshi T., Gupta A.: High Temperature Air Combustion
Joachim G. Wunning: Handbook of Burner Technology for Industrial Furnaces

Additional:
Synthesis gas combustion. Fundamentals and applications. Tim Lieuwen, Vigor Yang, Richard Yetter, CRC Press, 20096.R.S. Benson, N.D. Whitehouse: Internal Combustion Engines. Pergamon Press, 1979

Breakdown of average student's workload

	Hours	ECTS
Total workload	25	1,00
Classes requiring direct contact with the teacher	15	0,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	10	0,50