COURSE DESCRIPTION CARD - SYLLABUS

Course name
Environmental protection in the power industry [S2Elenerg1>OŚwE]

Course

Field of study
Electrical Power Engineering

Year/Semester
1/2

Area of study (specialization)
Renewable Sources and Storage of Energy

Profile of study
general academic

Level of study
second-cycle

Course offered in
Polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
30

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

Prerequisites

Basic knowledge of the power system structure. Knowledge of the structure of the manufacturing sector and the transmission sector.

Course objective

Understanding the impact of the generation and transmission sectors operation of the power system on the environment.

Course-related learning outcomes

Knowledge:
student has knowledge of the impact of the electromagnetic field on the environment and living organisms.
student has knowledge of the impact of the system power plants operation fired with solid and gaseous fuels on the natural environment

Skills:
student can determine exhaust emission rates for power units.

student is able to follow the recommendations in order to minimize the impact of the electromagnetic field on human.

Social competences:
student understands the need to minimize the negative impact of the power system operation on the natural environment.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
Lecture
Evaluation of the knowledge and skills in the form of written test

Programme content

Lecture
Presentation of production cycles in the domestic and global energy sector. The impact of energy conversion processes used in industry and the municipal sector on the natural environment. Methods of monitoring the natural environment in terms of determining the impact of technological processes on nature. Life cycles of selected machines and systems in the domestic power industry. Natural electric and magnetic field on Earth. Sources of artificial electric and magnetic field. The impact of electric and magnetic fields on people. Allowable value of electric and magnetic field. Methods of measuring electric and magnetic fields. Methods of reduction of electric and magnetic field.

Course topics

Presentation of the methodology for describing technological processes responsible for: obtaining mass and energy and discharging products into the natural environment. Characteristics of mass and energy sources for technological and municipal processes (air, water, soil). Discussion of methods of obtaining and processing fossil fuels (solid, liquid and gaseous fuels and uranium). Characteristics of renewable energy sources used in the world (wind, water, biomass, solar energy, ocean tides). Systems for monitoring global changes in the Earth's natural environment with examples of application. Detection methods and methods of collecting samples in real conditions - examples. A concise description of the impact of harmful changes in the natural environment on inanimate matter and the Earth's flora and fauna. Geoelectric field, geomagnetic field, impulse field, cosmic radiation, division criteria, examples of field source devices, research methods, thermal effect, non-thermal effect, various ways of regulating limit values in the world, limit values in Poland, limit values in the world, power lines , distribution stations, mobile telephone relays, the use of multi-circuit and multi-voltage lines, appropriate phase configuration, the use of grounded conductors, the use of multi-phase and coaxial lines, the maximum reduction of the spacing between phase conductors, placing phase conductors high, the use of DC voltage lines instead of AC voltage, use of grounded items.

Teaching methods

Lecture
Lecture with multimedia presentation supplemented with examples given on the board.

Bibliography

Basic
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3. Machczyński W., Wprowadzenie do kompatybilności elektromagnetycznej, Wydawnictwo Politechniki Poznańskiej, Poznań, 2004
4. Różański L., Pole i fale elektromagnetyczne, Wydawnictwo Politechniki Poznańskiej, Poznań, 1997
5. M. Pawlik, F. Strzelczyk: Elektrownie, WNT W-wa 2012, 2017.
6. J. Kucowski, D. Laudyn , M. Przekwas: Energetyka a ochrona środowiska, WNT, 1994.
Additional

1. Nadolny Z., Wartości dopuszczalne natężenia pola elektrycznego, magnetycznego oraz gęstości mocy pola elektromagnetycznego, Przegląd Naukowo-Metodyczny, Edukacja dla Bezpieczeństwa - 2016, nr 1, s. 1368-1382
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Breakdown of average student's workload

	Hours	ECTS
Total workload	29	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)	14	0,50