STUDY MODULE DESCRIPTION FORM

Name of the module/subject	Code
Electrical Engineering and Ecology	**1010314381010326974**

Field of study	Profile of study (general academic, practical)	Year /Semester
Power Engineering	**(brak)**	**4 / 8**
Elective path/specialty	Subject offered in:	Course (compulsory, elective)
Ecological Sources of the electric energy	**polish**	**obligatory**

Cycle of study:	Form of study (full-time,part-time)
First-cycle studies	**part-time**

No. of hours	No. of credits
Lecture: **9** Classes: **-** Laboratory: **9** Project/seminars: **9**	**4**

Status of the course in the study program (Basic, major, other)	(university-wide, from another field)
(brak)	**(brak)**

Education areas and fields of science and art	ECTS distribution (number and %)
technical sciences	**4 100%**
Technical sciences	**4 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Basic knowledge of the basics of automation, computer science and process technology in the energy sector.
2	**Skills**	Rules of programming on a general level. Ability to effectively self-education in a field related with the selected field of study.
3	**Social competencies**	He is aware the need to expand his competence, readiness to start cooperation in a team.

Assumptions and objectives of the course:

Get to know the different aspects of the impact of selected areas of electrical engineering at the current ecological problems. Active participation in the discussion on issues related to the theme of the lecture. Presentations news, original solutions and their own innovation.

Get to know with the methods of use of object-oriented programming to solve simple environmental and energy problems. Indicate the possibility of practical application window applications in the use of renewable energy sources.

Knowledge of legal requirements and methods to assess the energy-related investments on the environment. Familiar with the requirements of reports ratings the impact of the investment on the environment.

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. It has a basic and systematic knowledge of the knowledge of renewable and non-renewable sources of electricity, the technology of production and the impact of the manufacturing process on the environment. - [K_W08+++]

2. It tracks trends in energy development in relation to environmental protection. - [K_W20+]

Skills:

1. Can estimate and calculate the energy yields, to analyze the economic and presentation application of the technology in the field of electricity generation, capture, interpret and compare the latest literature data on issues of ecology. - [K_U03+]

2. Can analyze a multi-systemic solutions with particular emphasis on operational parameters and costs. - [K_U08+]

Social competencies:

1. Is aware responsibility of the engineer-energy, in particular the impact of its activities on the environment. - [K_K02+++]

2. Understands the need for the formulation and inform the public in an understandable and important information on developments and trends in energy tasks. - [K_K06+]

Assessment methods of study outcomes

Lecture:
- evaluate the knowledge and skills listed on the written exam,
- continuous evaluation for each course.

Laboratory:
- test and favoring knowledge necessary for the accomplishment of the problems in the area of laboratory tasks,
- continuous evaluation for each course - rewarding growth of skills in using rules and methods,
- evaluation knowledge and skills related to the implementation of the practice tasks.

Class project:
- final project evaluation for the assessment of investment environmental impact,
- evaluation review progress made on the project, as well as active participation in the classes.

Obtaining bonus points for the activity in the classroom:
- propose to discuss additional aspects of the subject;
- the effectiveness of use of the knowledge gained during solving the given problem,
- ability to cooperate within a team practice executing the task detailed in the laboratory,
- developed aesthetic care reports and tasks - in the self-study.

Course description

Energy: division, rationalization, market shares. Current status and development plans in the area of pollution and the implementation of renewable energy sources in Poland compared to the European Union. Power: distribution, construction and operation, efficiency, cost of generation and transmission. Heat source in heating systems. The impact of the energy on the environment: causes and implications of pollution, examples of influence, prevention. The greenhouse effect: the phenomenon, greenhouse gases, reducing possibilities. The principle of operation of a passive house. Modern power generation technologies.

Programming: levels and languages. Applications: creation, protecting, testing. Ecology: the use of of calculation methods and applications.

Legal aspects of energy-related investments in the context of the impact on the environment. Assess the impact of the investment on the environment. Calculating emissions. The content and rules for the preparation of the environmental impact report.

Basic bibliography:

1. Kucowski J., Laudyn D., Przekwas M. "Energetyka a ochrona środowiska", WNT, Warszawa 1994

Additional bibliography:

1. Tytko R. "Odnawialne źródła energii", Wyd. OWG, Warszawa 2011
2. Odum H. T., Odum E. C. :"oncepts and methods of ecological engineering. Ecological Engineering " Elsevier, 2003
3. Polityka energetyczna Polski do 2030 roku, ROZPORZĄDZENIE RADY MINISTRÓW z dnia 9 listopada 2010 r. w sprawie przedsięwzięć mogących znacząco oddziaływać na środowisko
4. Roczniki Statystyczne. Ochrona Środowiska. GUS Warszawa 2010-...
5. Internet
6. Research and diploma papers of IEEP

Result of average student's workload

Activity	Time (working hours)
1. participation in class lectures	9
2. participation in laboratory classes	9
3. participation in project activities	9
4. the consulting for class lectures	3
5. the consulting for laboratory classes	3
6. the consulting for project activites	3
7. preparation for active participation in lectures	9
8. preparation for laboratories and execution of independent tasks	19
9. implementation of project tasks	22
10. prepare for the exam	8
11. participation in the exam	2

Student's workload		
Source of workload	**hours**	**ECTS**
Total workload	96	4
Contact hours	38	1
Practical activities	67	2