COURSE DESCRIPTION CARD - SYLLABUS

Course name

EM: Power Engineering in the European Union and energy security - Power Engineering in the European Union

Course

Field of study	Year/Semester
Electrical engineering	3/5
Area of study (specialization)	Profile of study
-	practical
Level of study	Course offered in
First-cycle studies	Polish
Form of study	Requirements
full-time	elective

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
15	0	0
Tutorials	Projects/seminars	
15	0	

Number of credit points

2

Lecturers

Responsible for the course/lecturer:
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Responsible for the course/lecturer:

Prerequisites

Basic knowledge in electrical engineering, electrical power systems, information technology, and economics. Knowldge of basic characteristics of various energy sources and energy transmission technologies. Ability to perform basic calculations concerning power flow and electrical circuits. Awareness of the need to extend competences, readiness to cooperate within a team.

Course objective

Understanding European Union's strategy for energy supply considering the use of the environment, promotion of renewable energy sources, energy efficiency as well as resulting actions undertaken in Poland. Knowledge of the measures undertaken to implement such strategy. Understanding the principles of the European energy market's development and existing threats to the security of electiricty supply and possible measures to counteract them.

Course-related learning outcomes

Knowledge

1. Student knows the new development directions of renewable energy sources and has the knowledge of shaping energy market relations and energy management.

2. Student has the knowledge concerning structure of the power system and its relations with energy market and its possible influence on the environment.

3. Student can present the European Union's energy strategy and its implementation at the national level in order to achieve sustainable development of the energy sector.

Skills

1.Student is able to evaluate the applied technology of electricity and heat generation in terms of the production cost, market situation and environment conditions taking into consideration national and European requirements and restrictions.

2. Student can seek and suggest modifications of the current approach for the development of energy sources and market systems that meet the European Union' guidelines.

Social competences

1. Student is able to observe the relationships between the energy sector and the environment and is aware of the importance of complying with the common rules in the energy policy development in order to achieve the Community goals.

2. Student is aware of the need to cooperate in a team in order to perform multidisciplinary tasks considering both technical and non-technical aspects.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lectures:
- knowledge and skills assessment through a problem-based written test,
- continuous assessment during each class (rewarding attendance and active participation in the classes).

Tutorials:
- assessment of the knowledge necessary to solve problems in a given task area through written tests,
- continuous assessment during each class - rewarding the increase in the ability to use presented principles and methods.

Additional points for active participation in the classes, in particular:
- suggesting alternative solutions for considered issues,
- efficiency of using gained knowledge in solving problems,
- ability to cooperate within a team that handles a given task,
- remarks allowing for improvements of didactic materials.

Programme content

Lectures:

Structure of energy generation in the European Union considering various generation technologies. Sustainable energy policy in the EU in terms of reducing harmful emissions, promoting renewable energy sources and increasing energy efficiency. Costs of generating electricity and heat, taking into account the impact on the environment (CO2, SO2) for different sources. Legal regulations on the energy markets. Cross-border exchange in the area of electricity and gas. The role of ENSTO-E in shaping a uniform European power system. Competitiveness assessment of energy supply. Energy efficiency and solutions for increasing energy efficiency.

Tutorials:

Competitiveness assessment of energy supply. Unit costs of energy generation for various electricity sources. Cross-border exchange in the area of electricity and gas. Energy efficiency and solutions for increasing energy efficiency.

Teaching methods

Lecture: multimedia presentation - informational and problem lectures supplemented with examples presented on the board, elements of brainstorming and discussion

Tutorials: multimedia presentation with calculation examples presented on the board, problem methods, expert table method

Bibliography

Basic

1. Dołęga W., Planowanie rozwoju sieciowej infrastruktury elektroenergetycznej w aspekcie bezpieczeństwa dostaw energii i bezpieczeństwa ekologicznego, Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 2013
2. Górzyński J., Efektywność energetyczna w działalności gospodarczej, Wydawnictwo Naukowe PWN, Warszawa 2017
3. Kaczmarski M., Bezpieczeństwo energetyczne Unii Europejskiej. Wydawnictwo Akademickie i Profesjonalne, 2010.
4. Pach-Gurgul A., Jednolity rynek energii elektrycznej w Unii Europejskiej w kontekście bezpieczeństwa energetycznego Polski, Difin 2012
5. Wysocki R., Prawo energetyczne i wybrane przepisy energoefektywne, POLCEN, 2014.

Additional

1. Jurkowska-Gomułka A., Polityki Unii Europejskiej. Polityki sektorów infrastrukturalnych - aspekty prawne, Warszawa 2010
2. Wojtkowska-Łodej G., Uwarunkowania rozwoju energetyki w zakresie polityki energetycznej i regulacyjnej, ELIPSA Warszawawa 2016
3. Załącznik do Decyzji wykonawczej Komisji (UE) 2017/1442 z dnia 31 lipca 2017 r. ustanawiającej

konkluzje dotyczące najlepszych dostępnych technik (BAT) w odniesieniu do dużych obiektów energetycznego spalania zgodnie z dyrektywą Parlamentu Europejskiego i Rady 2010/75/UE

Breakdown of average student's workload

	Hours	ECTS
Total workload	48	2,0
Classes requiring direct contact with the teacher	33	1,0
Student's own work (literature studies, preparation for tutorials, preparation for tests) [1]	15	1,0

[1] delete or add other activities as appropriate