COURSE DESCRIPTION CARD - SYLLABUS

Course name
Wind power plants [S1Energ2>EW]

Course

Field of study
Power Engineering

Year/Semester
3/6

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
Polish

Form of study
full-time

Requirements
elective

Number of hours

Lecture
15

Laboratory classes
15

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

2,00

Coordinators

dr inż. Artur Bugała
artur.bugala@put.poznan.pl

Lecturers

Prerequisites

Basic knowledge of mathematics,informatics, electrical engineering and electrical power engineering at level of High School.Skills in understanding and interpretation knowledge to analysis effects of conversion wind energy on electrical. Student shoulh have consciousness of necessity of improving his competences, readiness to work individual and cooperate within group.

Course objective

Acquainted theoretical and practical problems connected with design, construct and operate wind power plants. Command of principle select localization wind power plants within anlysis results of measurements.

Course-related learning outcomes

Knowledge:
Basic knowlege of renewable energy sources and concersion wind energy on electrical energy. Knows basic lows field of wind energy. Orientable in compulsory polish and UE norms and instructions applying wind power plants. Knows measuring methods and can analyse results and their influence on production electrical energy. Orientation in present methods assembly ,operate and disassembly wind power plants type on shore and off shore.

Skills:
Ability to get information from literature, web , technical documentation , recommendations and other sources. Ability to compare various solutions and tested wind velocity, roughness of terrain, temperature and air density. Student is ready to work individual and in a team.

Social competences:
Think and operate in enterprising way in the field of renewable energy sources within wind energy plants.Ability to analyse problems of equalized development.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: written tasks verifying a knowledge and proper understanding problems wind power plants.Asses the knowledge and skills listed on the written form with basic and problematics tasks in the field on wind power plants.
Laboratory: -Assesment of the form and content of the project for example presenatation in Power aPoint-Favoring systematic progress in the project. Get additional points for the activiti in the classroom particular by abiliti to work within a team.

Programme content

The program covers technologies for wind farms with vertical and horizontal rotation axis, transmission of electricity from the wind farm to the GPZ as well as their environmental requirements.

Course topics

Technology wind power plants HAWT and VAWT. Build and direct action wind power plants. Assembly and influence wind power plants on environment. Investment in wind power plants. Influence of wind velocity, air dnsity, temperature, roughness of terrain and others on production electrical energy by wind power plants. Economical aided systems on renewable energy sources. Auction system RES.

Teaching methods

Lecture: presentation in Power Point aided dy technical documantation and other materials.
Laboratory: presentation in Power Point aided carry out earlier projects. Technical documentations.

Bibliography

Basic:
1. Lubośny Z.: Elektrownie wiatrowe w systemie elektroenergetycznym. WNT, Warszawa, 2007.
2. Lewandowski W., Klugmann-Radziemska E.: Proekologiczne odnawialne źródła energii.Wyd. Naukowe PWN. 2017.
3. Zmarzły D.:Badania jakości energii w wybranej farmie wiatrowej. Politechnika Opolska. Oficyna Wyd.Politechniki Opolskiej.2014.
4. Jastrzębska G.: Odnawialne źródła energii i pojazdy proekologiczne. WNT, Warszawa 2009.
5. Lubośny Z.: Farmy wiatrowe w systemie elektroenergetycznym. WNT, Warszawa 2013.
6. PN-EN 61400- (1-27). Turbozespoły wiatrowe.

Additional:
1. Krawiec F.: Energia. Wyd. Dyfin, Warszawa 2012.
2. Niedziółka D.: Rynek energii w Polsce. Wyd. Dyfin, Warszawa 2010.
3.Skarżyński G, Kałek P. : Aukcje OZE 2019. Praktyczny przewodnik po noweliozacji Ustawy OZE. SKU: OZE 2019-PL

Breakdown of average student's workload

	Hours	ECTS
Total workload	55	2,00
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)	25	1,00