COURSE DESCRIPTION CARD - SYLLABUS

Course name

Fundamentals of electric power engineering

Course

Field of study

Electrical Engineering

Year/Semester

2/3

Area of study (specialization)

-

Profile of study

general academic

Level of study

First-cycle studies

Course offered in

polish

Form of study

part-time

Requirements

compulsory

Number of hours

Lecture

20

Laboratory classes

10

Other (e.g. online)

0

Tutorials

10

Projects/seminars

0

Number of credit points

5

Lecturers

Responsible for the course/lecturer:

dr inż. Krzysztof Szubert

email: krzysztof.szubert@put.poznan.pl

tel.616652282

The Faculty of Environmental Engineering and Energy

ul. Piotrowo 3A, 60-965 Poznań

Responsible for the course/lecturer:

dr inż. Bartosz Ceran

email: bartosz.ceran@put.poznan.pl

tel.616652523

The Faculty of Environmental Engineering and Energy

ul. Piotrowo 3A, 60-965 Poznań

Prerequisites

Basic knowledge in mathematics, physics and electrical engineering, mainly on AC circuits calculations. General-level programming skills and effective self-education skills concerning the domain related to the chosen direction of studies. Is aware of the need to widen his competences and to undertake the team cooperation.

Course objective

Getting basic knowledge on the electric power system, structure of its fundamental components (lines and transformers), its operating condition analysis, as well as on the electrical grids design, construction and computing.

Course-related learning outcomes

Knowledge

1. Student as acquired elementary knowledge on basic regulations within the electric power system annd control of the small hydropower plants cooperating in the micro-grids.

2. Student has acquired elementary knowledge on modeling and analysis of the simple transmission systems and power supply networks as well as on the power sources balance in the electric power system

Skills

1. Student can choose elements of the measuring system and the power and energy consumption control system in the selected electrical energy supply systems.

2. Student can apply the rules of rational electric power management related to the selected production process.

Social competences

1. Student is aware of the engineer?s responsibility for his actions and for the tasks carried out in the team co-operation.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture:

- evaluation of the knowledge and skills listed on the written exam,

Tutorials:

- credit on the basis of the current check messages and one written tests of the accounting tasks

Laboratory classes:

- assessment of knowledge and skills related to the implementation of the tasks your practice, the assessment of report of performed exercise,

- obtaining additional points for the ability to work within a team practice performing the task detailed in the laboratory and developed aesthetic diligence reports.

Programme content

Lecture:

General characteristics of electric power system operation; structure of the overhead- and cable electric power lines, modeling of the system?s basic elements, calculation of the power flow and short-circuit currents in the electric power grid, power and energy losses, basic system regulations, Reactive power compensation, structure and operation of electric power transformer, transformer?s insulation and cooling systems, bushing insulator.

Tutorials:

Calculation of transmission line parameters of type II and III. Fault current calculations.

Laboratory classes:

Modeling of power line type III in Matlab / Simulink environment.

Testing of electrical power equipment.

Teaching methods

Lecture:

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

Tutorials:

Tasks counted on the board.

Laboratory classes:

Measurements of device operating parameters at teaching stations and modeling of elements of the power system using engineering tools.

Bibliography

Basic

1. Kujszczyk Sz. (pod red.): Elektroenergetyczne układy przesyłowe, WNT, Warszawa, 1997.

2. Kujszczyk Sz. (pod red.): Elektroenergetyczne sieci rozdzielcze, tom 1 i 2, PWN, Warszawa, 2004.

3. Kacejko P., Machowski J.: Zwarcia w systemach elektroenergetycznych. WNT, Warszawa 2013.

4. Laudyn D., Pawlik M., Strzelczyk F.: Elektrownie, wyd. IV. WNT Warszawa. 2000.

5. Flisowski Z., Technika wysokich napięć, WNT, Warszawa, 2005

6. Szczepański Z., Czajewski J., Układy izolacyjne urządzeń elektro-energetycznych, WNT, 1978

7. Jezierski E., Gogolewski Z., Kopczyński Z., Szmit J. TRANSFORMATORY Budowa i projektowanie, WN-T Warszawa 1963 r

Additional

1. Adamska J., Niewiedział R.: Podstawy elektroenergetyki. Sieci i urządzenia elektroenergetyczne. Wyd. PP, Poznań 1989

2. Kowalski Z., Jakość energii elektrycznej. Wyd. Politechniki Łódzkiej, Łódź, 2007.

3. Praca zbiorowa: Napowietrzne linie elektroenergetyczne wysokiego napięcia, WN-T 1973

4. Ograniczanie strat energii elektrycznej w elektroenergetycznych sieciach rozdzielczych, pod redakcją J. Kulczyckiego, PTPiREE, Poznań 2002.

5. Żmuda K., Elektroenergetyczne układy przesyłowe i rozdzielcze ? Wybrane zagadnienia z przykładami. WPŚ, Gliwice 2016

6. James H. Harlow, Electric Power Transformer Engineering, CRC Press, 2012

Breakdown of average student's workload

	Hours	ECTS
Total workload	135	5,0
Classes requiring direct contact with the teacher	65	2,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam) [1]	70	3,0

[1] delete or add other activities as appropriate