Electrical equipmnet - course description

General information

Course name	Electrical equipmnet
Course ID	06.2-WE-ELEKTP-EE-Er
Faculty	Faculty of Computer Science, Electrical Engineering and Automatics
Field of study	Electrical Engineering
Education profile	academic
Level of studies	First-cycle Erasmus programme
Beginning semester	winter term 2019/2020

Course information

Semester	5
ECTS credits to win	5
Course type	obligatory
Teaching language	english
Author of syllabus	• dr hab. inż. Marcin Jarnut, prof. UZ

Classes forms

The class form	Hours per semester (full-time)	Hours per week (full-time)	Hours per semester (part-time)	Hours per week (part-time)	Form of assignment
Lecture	30	2	-	-	Credit with grade
Laboratory	30	2	-	-	Credit with grade

Aim of the course

Transfer of knowledge in the field of operation and improvement of energy efficiency of electrical equipment and lighting. Developing students basic skills in the selection and operation of equipment, placement and control of light sources according to the criterion of minimizing energy consumption. Awareness of the role of modern, highly effective technical solutions in activities serving the implementation of energy policy focused on low-carbon economy

Prerequisites

electrical engineering, power electronics, physics

Scope

Lectures:

Classification of electrical devices. Requirements for the operation of electrical equipment

Electric heating devices: resistive, radiant, electrode, arc, induction, capacitive, microwave.

Fan and compressor devices. Refrigeration, air conditioning and compressed air systems.

Pump equipment and systems.

Welders and welding equipment.

Devices for electrostatic and electrochemical systems.

Electric handling equipment.

Basic concepts of photometry and colorimetry.

Electric light sources.

Shaping spatial light distribution. Light fixtures.

Interior lighting. General lighting and workplaces.

Outdoor and road lighting. Object illumination.

Emergency and evacuation lighting.

Elements and systems of lighting automation.

Laboratory:

Measurements in the area of electrical equipment safety assessment

Resistance heating system testing

Induction heating system test

Compressor system test

Pump system testing

Investigation of photometric and energy properties of light sources.

Test of partition coefficient of reflection.

Study on the impact of the fixture angle on the luminous flux distribution.

Investigation of the influence of the shield penetration coefficient on the photometric properties of the lighting system.

Examination of ignition systems and lighting intensity control systems.

Examination of regulatory properties of the lighting automation system with the DALI bus.

Computer aided lighting system design.

Teaching methods

Lecture: conventional (multimedia) lecture, problem-solving lecture

Laboratory: laboratory exercises, work in groups

Learning outcomes and methods of theirs verification

Outcome description	Outcome symbols	Methods of verification	The class form
The student has knowledge about the operation, operation and energy consumption of electrical electrical equipment and lighting systems, as well as methods of reducing it while maintaining normative and operational requirements		• an evaluation test	• Lecture
The student has laboratory verified knowledge of the operation of electrical devices, energy and photometric characteristics of electric light sources, knows the operation of basic lighting control systems		• carrying out laboratory reports	• Laboratory

Assignment conditions

Lecture:

The final grade consists of: colloquium grade with a weight of 100%.

Laboratory:

The final grade is the arithmetic average of the partial grades issued for the report of each laboratory class made by students.

Final grade:

The final grade of the subject is determined as the arithmetic average of the grades for all forms of the subject with the weight: lecture 50%, laboratory 50%.

Recommended reading

1. Kochel M., Niestępski S.: Elektroenergetyczne sieci i urządzenia przemysłowe.
2. Strzałka J., Strzałka J.: Projektowanie urządzeń elektroenergetycznych, AGH, 2001.
3. Teresiak Z.: *Elektroenergetyka zakładów przemysłowych*; Politechnika Wrocławska, 1981.
4. Kujszczyk S.: Elektroenergetyczne sieci rozdzielcze. PWN, Warszawa, 2004
5. P. Pracki, *Projektowanie oświetlenia wnętrz*, Oficyna Wydawnicza Politechniki Warszawskiej
6. J. Bąk, *Wydajne energetycznie oświetlenie wnętrz. Wybrane zagadnienia*. Stowarzyszenie Elektryków Polskich, Centralny Ośrodek Szkolenie i Wydawnictw
7. J. Ratajczak, *Oświetlenie iluminacyjne obiektów architektonicznych,* Wydawnictwo Politechniki Poznańskiej
8. D. Czyżewski, S. Zalewski, *Laboratorium fotometrii i kolorymetrii*, Wydawnictwo Politechniki Warszawskiej
9. Philip Kiameh, *Electrical Equipment Handbook : Troubleshooting and Maintenance,* McGraw-Hill Professional;
10. IESNA Lighting Handbook, Illuminating Engineering

Further reading

Notes

Modified by dr hab. inż. Marcin Jarnut, prof. UZ (last modification: 31-10-2019 10:17)