COURSE DESCRIPTION CARD - SYLLABUS

Course name
Electrical load profile of urban and industrial facilities [S2Elenerg1-UEE>POE2]

Course

Field of study
Electrical Power Engineering

Year/Semester
1/2

Area of study (specialization)
Electric Energy Exploitation

Profile of study
general academic

Level of study
second-cycle

Course offered in
Polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
15

Laboratory classes
15

Other (e.g. online)
0

Tutorials
0

Projects/seminars
0

Number of credit points

2,00

Coordinators

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Lecturers

Prerequisites

Basic information on the functioning of electrothermal, lighting and drive devices. Knowledge of the operation of installation security and building automation elements. Ability to create and analyze electrical diagrams. Ability to perform basic electrical measurements.

Course objective

Obtaining extended knowledge in the field of issues related to the demand for electricity in urban and industrial facilities. Expanding knowledge in the field of knowledge of the operational features of electrothermal, lighting and drive devices. Acquisition of skills necessary to implement power supply projects for these facilities. The ability to assess the impact of receivers on the quality parameters of electricity in supply circuits.

Course-related learning outcomes

Knowledge:
student has in-depth knowledge of the operational characteristics of power supply circuits in municipal and industrial facilities. student knows the operation of receiving devices (electrothermal, lighting, driving) in the use of electrical engineering laws. student knows the areas of use of heating, lighting and

drive systems in industrial and urban facilities.

Skills:
student is able to perform basic research related to the operation of electrothermal, lighting and propulsion devices and the related safety of their use. student is able to determine the demand for electricity for receiving devices and to design their supply and protection circuits. student has the ability to optimally select the receiving devices that constitute the equipment of municipal and industrial facilities.

Social competences:
student is aware of the principles of professional ethics in the design of power circuits for receiving devices in buildings. student plans tasks respecting the rights of other designers and users of buildings.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

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Lecture:
- knowledge acquired as part of the lecture is verified by a written final exam consisting of open or test questions with different points. Passing threshold: 50% of points,
- current grading in each lecture (rewarding activities).
Laboratory classes:
- current check and rewarding knowledge necessary for the accomplishment of the problems in the area of laboratory tasks,
- evaluation of reports performed on laboratory classes,
- rewarding activities related to the implementation of laboratoy classes.

Programme content

Issues related to the demand for electrical power in urban and industrial facilities. Profiles of electricity consumers. Power quality in electrical circuits. Elements of power supply and power distribution design.

Course topics

Lecture:
Issues related to power and electricity demand in urban and industrial facilities. Energy intensity of consumer equipment including lighting and electro-thermal equipment. Improving the energy efficiency of consumer equipment. Data acquisition of energy consumption. Profiling of consumers. Power quality in consumer circuits and its impact on the operation of consumers. Power factor and its improvement in consumer circuits. Elements of power supply and energy distribution design in industrial plants. Power supply design of municipal consumers in terms of their equipment specifications.

Laboratories:
Classes discussing the rules and regulations of the laboratory, the topics of the laboratory exercises to be carried out, as well as health and safety training related to the operation of laboratory stations. To complete 6 two-hour laboratory exercises on the subject matter of the course.

Teaching methods

Lecture:
- multimedia or object-oriented presentations supported by illustrated examples presented on the board,
- interactive lecture with questions and initiating discussions.
Laboratory classes:
- object-orientedpresentations supported by illustrated examples presented on the board,
- presentations of selected experiments,
- initiating teamwork.

Bibliography

Basic

1. Hauser, J. Podstawy elektrotermii i techniki świetlnej, Wydawnictwo Politechniki Poznańskiej, 2006 r.
2. Rodacki, T., Kandyba, A. Urządzenia elektrotermiczne, Wydawnictwo Politechniki Śląskiej, 2002 r.
3. Marzecki, J. Sieci elektroenergetyczne w obiektach przemysłowych. Wybrane zagadnienia. Oficyna Wydawnicza Politechniki Warszawskiej, 2015 r.
4. E. Niezabitowska, J. Sowa, Z. Staniszewski, D. Winnicka-Jasłowska, W. Badroń, A. Niezabitowski. Budynek inteligentny. Potrzeby użytkownika a standard budynku inteligentnego. Wydawnictwo Politechniki Śląskiej, Gliwice, 2000.
5. J. Mikulik. Budynek inteligentny. Podstawowe systemy bezpieczeństwa w budynkach inteligentnych. Wydawnictwo Politechniki Śląskiej, Gliwice, 2000.
6. A. Kamińska A, L. Muszyński, Z. Boruta, R. Radajewski, Nowoczesne techniki w projektowaniu energooszczędnych instalacji budynkowych w systemie KNX, POIG.02.02.00-00-018/08-00, Warszawa 2011.
Additional
1. Strzelecki, R.; Sypronowicz, H. Filtracja harmonicznych w sieiach zasilających prądu przemiennego, Polska Akademia Nauk, 1998 r.
2. Rodacki, T,; Kandyba, A. Urządzenia elektrotermiczne, Wydawnictwo Politechniki Śląskiej, 2002 r.
3. Toulouevski, Y.N.; Zinurov, I.Y. Innovation in electric arc furnaces, Springer, 2013 r.
4. Karbowniczek, M. Electric arc furnace steelmaking, Taylor and Francis Group, 2021 r.
5. Muhlbauer, A. History of induction heating and melting, Vulkan Verlag, 2008 r.
6. Dombek, G.; Nowak, K.; Książkiewicz, A.; Bochenek, B.; Nowaczyk, P.; Pluta, P. Zastosowanie przekaźników PLC do realizacji algorytmów sterowania ogrzewaniem. Poznan University of Technology Academic Journals. Electrical Enginnering, 2017, Issue 92, pp.415-425.
7. Normy przedmiotowe.
8. Publikacje internetowe.

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