COURSE DESCRIPTION CARD - SYLLABUS

Course name
Computer-aided design of power devices and installations [N1Eltech1>F-KWPUiIE]

Course

Field of study
Electrical Engineering

Year/Semester
5/9

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
Polish

Form of study
part-time

Requirements
elective

Number of hours

Lecture
0

Laboratory classes
0

Other
0

Tutorials
0

Projects/seminars
30

Number of credit points

3,00

Coordinators

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Lecturers

Prerequisites

Knowledge of the basics of electrical engineering, electrical power engineering, basic numerical methods.

Course objective

Acquaintance with selected numerical methods and computer programs supporting the process of modeling physical phenomena and design of power devices and installations. Student is able to independently solve simple tasks in the field of electrical engineering, power engineering and use the available computer programs. Student has the ability to work in a team.

Course-related learning outcomes

Knowledge:
Student has knowledge in the field of design, construction and operation principles of power devices and installations. Student has structured and theoretically founded knowledge about the construction and operation of distribution and power devices as well as electrical installations.

Skills:
Student is able to use computer applications to analyze and evaluate the operation of electrical components and systems in the design of power devices and installations. Student is able to use properly selected programming environments, simulators and IT tools to support design.

Social competences:
Student is aware of the need for continuous education and raising professional competences. Student is aware that in technology knowledge and skills quickly become obsolete.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

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Projects:
- the preparation of materials for the project is evaluated,
- substantive preparation for the implementation of the assigned project is evaluationed,
- project and its defense are evaluated.

Programme content

Projects:
Assigned project to be implemented in the field of computer-aided design of power devices and installations including output data, design diagrams, replacement diagrams and technical calculations. An introduction to the operation of an artificial neural network simulator (SSN). Exercises in entering learning data into the SSN and description of this data. Creating and learning SSN simple mathematical operations using default program parameter values. Study on the impact of changing selected parameters of the SSN simulator on the network learning process. Exercises for presenting the results of the SSN. Teaching the neural network to recognize logic gate states. The use of SSN to model curves describing the results of measurements. The use of SSN to model social phenomena. Designing the SSN to identify defects of the selected insulation system

Course topics

Introduction to the operation of artificial neural network (ANN) simulators. Exercises with constraints on learning data for ANNs and the description of this data. Creating and teaching ANN simple mathematical operations using default program parameter values. Study of the influence of selected parameters of the ANN simulator on the network learning process. Exercises on presenting the results of ANN work. Training a neural network to recognize logic gate states. ANN models curves describing research results. Disease ANNs for modeling social phenomena. ANN solution for identifying insulation configuration defects. Working in Solidworks. Thermal modeling using Solidworks

Teaching methods

Projects:
- using dedicated or developed computer applications, graphic programs and catalogs of installation equipment manufacturers.

Bibliography

Basic
1. Osowski S., Sieci neuronowe do przetwarzania informacji, Wydawnictwo OWPW, 2013.
2. Kosiński R. A., Sztuczne sieci neuronowe Dynamika nieliniowa i chaos, WNT, 2014.
3. Migdał K., Najman K., Samouczące się sztuczne sieci neuronowe w grupowaniu i klasyfikacji danych.Teoria i zastosowanie w ekonomii., Wydawnictwo Uniwersytetu Gdańskiego, 2013.
4. Markiewicz H.: Instalacje elektryczne, WNT, Warszawa, 2012.
5. Niestępski S., Parol M., Pasternakiewicz J., Wiśniewski T.: Instalacje elektryczne. Budowa projektowanie i eksploatacja, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2011.
Additional
1. Bernat J., Gielniak J., Morańda H., Program komputerowy wykorzystujący sztuczne sieci neuronowe do interpretacji wyników badań przy użyciu metody RVM w celu oceny zawilgocenia izolacji papierowej

transformatorów, Przegląd Elektrotechniczny, 2008, Tom 84, Nr 10, ss. 5-7.
2. Normy i rozporządzenia związane z instalacjami elektrycznymi.
3. Katalogi producentów oprzewodowania i aparatów instalacyjnych.

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,00
Classes requiring direct contact with the teacher	45	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	30	1,00