COURSE DESCRIPTION CARD - SYLLABUS

Course name

Decision algorithms in the Electric Power Engineering

Course

Field of study

Electric Power Engineering

Area of study (specialization)

common course

Level of study

Second-cycle studies

Form of study

part-time

Year/Semester

2/3

Profile of study

general academic

Course offered in

polish

Requirements

compulsory

Number of hours

Lecture

10

Laboratory classes

10

Other (e.g. online)

Tutorials

Projects/seminars

Number of credit points

3

Lecturers

Responsible for the course/lecturer:

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Responsible for the course/lecturer:

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Prerequisites

Has knowledge of the basics of electrical engineering, electrical power engineering and numerical methods.

He can create his own algorithms and simple computer programs.

Is aware of teamwork.

Course objective

Acquainted with methods and algorithms that allow the processing of large amounts of data. Understanding the theoretical and practical applications of algorithms, procedures and data structures to ensure the proper functioning of power systems.

Course-related learning outcomes

Knowledge

1. Has in-depth knowledge of the phenomena occurring in the power system and the calculation methods used.

2. Has knowledge in the field of creating algorithms for IT systems used in the power sector.

3. Has knowledge of the identification of power system operation states.

4. Has solid knowledge on the subject of intellectual property protection and the use of information in business activities.

Skills

1. Can adapt the selection of calculation methods to the task being carried out.

2. Is able to assess the processes of implementation of tasks and based on the algorithm write a computer program in the field of power engineering in a higher language.

3. Is able to work individually and in a team and based on the given algorithms make decisions in the power sector by operating various computer programs.

Social competences

Is aware of the proper coordination of its activities within small project groups.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:
Lecture: assessment of activity in class, assessment of homework, final test in writing at the end of the semester, colloquium includes test questions or problem tasks, written exam covering the subject of the subject assessed on a scale of 0 to 100%, the final grade lectures given by more than one lecturer based on weighted average, final grade for more than one component grade based on weighted average

Laboratory: verification of individual preparation for classes, including material from a single exercise or block of exercises, assessment of individual exercise reports made by the student, colloquium at the end of the semester, colloquium includes test questions or problem tasks, all grades on a scale of 0 to 100%, final grade based on the weighted average of all component ratings

Programme content

Lecture

High level programming languages, use in programming available libraries. Genetic algorithms, fuzzy logic, machine learning system, artificial neural networks. Processing of large data structures.

Optimization and decision problems. Decision algorithms - making decisions under risk conditions, identifying the state of the power system operation. Algorithms for calculating power flows, control algorithms. Algorithms for preventing system failures.

Laboratory

Genetic algorithms, fuzzy logic, machine learning, artificial neural networks. Application of libraries of ready functions and procedures as well as API interfaces. Creating algorithms and computer programs that perform specific network tasks.

Teaching methods

Lecture: multimedia and interactive presentation presenting important issues related to the subject, didactic discussion based on the literature on the subject, informative lecture, problem lecture, case study, work on source materials

Laboratory: implementation of exercises, use of publicly available information and software tools to support the didactic process, encouraging students to independently search for optimal solutions and problem solving

Bibliography

Basic
1. Kremens Z., Sobierajski M., Analiza systemów elektroenergetycznych, WNT, Warszawa 1996

2. Dołęga W.: Stacje elektroenergetyczne, Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 2007

3. Kożuchowski J., Sterowanie systemami elektroenergetycznymi, PWN, Warszawa 1994

4. Rutkowska D., Piliński M., Rutkowski L., Sieci neuronowe, algorytmy genetyczne i systemy rozmyte, PWN, Warszawa, 1999

Additional
1. J.Machowski, Regulacja i stabilność systemu elektroenergetycznego, Oficyna Wydawnicza Polit. Warszawskiej, Warszawa 2007

2. Bąchorek W., Gancarz A., Algorytmy genetyczne w projektowaniu układów zasilania rezerwowego elektroenergetycznych sieci rozdzielczych średniego napięcia, Zeszyty Naukowe Wydziału Elektrotechniki i Automatyki Politechniki Gdańskiej, XVII Seminarium ?Zastosowanie komputerów w nauce i technice? 2007, Oddział Gdański PTETiS, ss.11-14

Breakdown of average student's workload

	Hours	ECTS
Total workload	92	3
Classes requiring direct contact with the teacher	25	1
Student's own work (literature studies, preparation for laboratory classes, preparation for tests, preparation of lab reports)[1]	67	2

1 delete or add other activities as appropriate