COURSE DESCRIPTION CARD - SYLLABUS

Course name
Numerical methods in electrical power engineering

Course

Field of study
Electrical power engineering

Year/Semester
1/1

Area of study (specialization)

Profile of study
general academic

Level of study
Second-cycle studies

Course offered in
polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
10	10	0
Tutorials	**Projects/seminars**	
0	0	

Number of credit points

2

Lecturers

Responsible for the course/lecturer:
Karol Gajda, Ph.D.,Eng.

Faculty of Control, Robotics and Electrical Engineering

Institute of Mathematics

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tel. 61 665 2805

Responsible for the course/lecturer:

Prerequisites

The student starting this course should have the knowledge and skills of the numerical methods course from the first cycle studies. He should know the limitations of his own knowledge and understand the need for further education.

Course objective

Presentation of advanced numerical methods useful in solving complex engineering problems, including in the field of power engineering. Supporting engineering calculations with appropriate IT tools.

Course-related learning outcomes

Knowledge

He has deep knowledge of numerical methods, mathematical modeling and software supporting calculations in the power engineering.

Skills

Has the ability to apply and modify mathematical models in the power engineering.

Social competences

He understands the necessity to educate the society in the field of electricity and energy security. Works creatively and enterprisingly.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The knowledge acquired during the lecture is verified by a 45-minute test consisting of variously scored questions. Passing issues on the basis of which the questions are developed will be given to students during the lecture preceding the colloquium, or sent by e-mail using the university's e-mail system.

The skills acquired during the laboratory classes are verified on the basis of the developed projects.

Programme content

1) lectures:

- discrete Fourier transform,

- periodic Fourier transform,

- partial differential equations,

- FEM (triangles, boundary conditions, iterations, accuracy of calculations, etc.),

2) laboratory:

- Fourier transform,

- partial differential equations,

- FEM.

Teaching methods

1) lectures:

- lecture with presentation supplemented with examples given on the board,

- a lecture with the formulation of questions to a group of students or to identified specific students,

- student activity during classes is taken into account when assigning the final grade,

- initiating discussions during the lecture,

- theory presented in connection with practice,

- theory presented in relation to the current knowledge of students,

- introducing a new topic, preceded by a reminder of related content, known to students from other subjects.

2) laboratory:

- review of reports by the laboratory operator and discussion of comments,

- using tools that enable students to perform tasks at home,

- demonstrations,

- work in teams,

- computational experiments.

Bibliography

Basic

1. Kincaid D., Cheney W., Analiza numeryczna [Numerical Analysis: Mathematics of Scientific Computing (The Sally Series; Pure and Applied Undergraduate Texts, Vol. 2)], WNT, Warszawa 2006.

2. Fortuna Z., Macukow B., Wąsowski J., Metody numeryczne, WNT, Warszawa, 2017.

Additional

1. Markiewicz T., Szmurło R., Wincenciak S., Metody numeryczne. Wykłady na Wydziale Elektrycznym Politechniki Warszawskiej, OWPW, Warszawa, 2015.

Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,0
Classes requiring direct contact with the teacher	20	1,0
Student's own work (literature studies, preparation for laboratory classes, preparation of reports, preparation for the final test) [1]	30	1,0

[1] delete or add other activities as appropriate