



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Electromagnetic field in high voltage systems

Course

Field of study

Electrical Engineering

Area of study (specialization)

High Voltage Engineering

Level of study

Second-cycle studies

Form of study

full-time

Year/Semester

2/3

Profile of study

general academic

Course offered in

polish

Requirements

elective

Number of hours

Lecture

0

Laboratory classes

0

Other (e.g. online)

0

Tutorials

0

Projects/seminars

15

Number of credit points

1

Lecturers

Responsible for the course/lecturer:

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Faculty of Environmental Engineering and

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Responsible for the course/lecturer:

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Prerequisites

The student has knowledge in the field of construction of high voltage insulation systems. Has the ability to effectively self-learning in the scope of chosen field of study and is aware of the need to expand his knowledge, ability, competences. Can work and cooperate in group.

Course objective

Extending knowledge about the insulation systems of high voltage devices. Acquainting with the distribution of electric and magnetic field intensity in high voltage insulation systems. Understanding the methods of electromagnetic field intensity analysis. Understanding the properties of materials that affect the distribution of electromagnetic field intensity. Understanding the effects of material homogeneity on the distribution of electric field intensity. Acquainting with methods enabling control of electric field distribution in insulation systems.



Course-related learning outcomes

Knowledge

Student has expanded knowledge in the area of high voltage insulation system design and its influence on electromagnetic field distribution.

Skills

The student is able to assess and compare design solutions due to the given criteria related to the distribution of electromagnetic field intensity.

Social competences

Student acknowledges the importance of knowledge in solving cognitive and practical problems.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

- continuous assessment, during each project classes - rewarding the increase in the ability to use learned methods and software,
- assessment of knowledge and skills related to the implementation of the project task, assessment of the effects of project work and how it is presented.

Programme content

Analysis of the distribution of the electromagnetic field intensity in the insulation systems of power devices using specialized software. Analysis of electric field intensity in systems with Rogowski profile and in systems of dielectrics in series and in parallel. Analysis of the impact of inclusions in insulation systems on the distribution of electric field intensity. Electromagnetic field analysis around high voltage lines.

Teaching methods

Work on computers using software to analyze the distribution of electromagnetic field intensity. Design classes are supplemented with multimedia presentations. Joint solving of problems arising during the analysis of electromagnetic field distribution. The use of tools enabling students to perform tasks at home (open source software, e.g. Maxwell SV) is foreseen.

Bibliography

Basic

1. Gacek Z., Wysokonapięciowa technika izolacyjna, Wydawnictwo Politechniki Śląskiej, Gliwice 2006
2. Furgał J., Układy izolacyjne urządzeń stacji wysokiego napięcia, Wydawnictwo AGH, Kraków 1995
3. Flisowski Z., Technika wysokich napięć, Wydawnictwo Naukowo-Techniczne, Warszawa 2017
4. Gacek Z., Kształtowanie wysokonapięciowych układów izolacyjnych stosowanych w elektroenergetyce, Wydawnictwo Politechniki Śląskiej, Gliwice, 2002
5. Celiński Z., Materiałoznawstwo elektrotechniczne, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2005



Additional

1. Mościcka-Grzesiak H., Inżynieria wysokich napięć w elektroenergetyce, Wydawnictwo Politechniki Poznańskiej, tom I – 1996
2. Mościcka-Grzesiak H., Inżynieria wysokich napięć w elektroenergetyce, Wydawnictwo Politechniki Poznańskiej, tom II – 1999

Breakdown of average student's workload

	Hours	ECTS
Total workload	38	1,0
Classes requiring direct contact with the teacher	16	1,0
Student's own work (literature studies, project preparation) ¹	22	1,0

¹ delete or add other activities as appropriate