



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

High current processes

### Course

Field of study

Electrical Engineering

Area of study (specialization)

Distribution Devices and Electrical Installations

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

compulsory

### Number of hours

Lecture

15

Laboratory classes

0

Other (e.g. online)

0

Tutorials

0

Projects/seminars

0

### Number of credit points

1

### Lecturers

Responsible for the course/lecturer:

Prof. Jerzy Janiszewski, Ph. D., Hab. Eng.

Responsible for the course/lecturer:

Faculty of Environmental Engineering and  
Energy

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### Prerequisites

Basic knowledge of the construction and operation of electrical apparatus and installations, and measuring apparatus and its use. Ability to obtain information from the literature and critical analysis. Understanding the need for creative action to promote and implement the effects of technical progress.

### Course objective

Reach expanded knowledge about the processes associated with the high currents and their influence on the design of the busbar.

### Course-related learning outcomes

Knowledge



Student has expanded knowledge in the field of dynamic and thermal phenomena in the high current busbar and contact current as well as in the construction of such high current busbars and their impact on the environment.

#### Skills

Student is able to formulate assumptions for the design of an electrical device or system, taking into account legal aspects, and other non-technical aspects such as impact on the environment, using, among others, standards regulating the operation of electrical devices.

#### Social competences

Student is able to think and act in a professional manner and present their own concepts and defend them in discussions with the technical environment.

#### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture:

- knowledge acquired as part of the lecture is verified by a written final test consisting of open or test questions with different points. Passing threshold: 50% of points,
- current grading in each lecture (rewarding activities).

#### Programme content

Lecture:

Phenomena in high-current tracks with particular emphasis on skin effects and proximity effects. The influence of current paths with ferromagnetic masses. Distribution of current intensity and electrodynamic interactions in multi-band tracks. Phenomena in contacts with very high conducting currents. A high-current electric arc. Presentation of constructional solutions of tracks and contact systems of sample switches.

#### Teaching methods

Lecture:

- multimedia or object-oriented presentations supported by illustrated examples presented on the board,
- interactive lecture with questions and initiating discussions.

#### Bibliography

Basic

1. Maksymiuk J., Niezawodność maszyn i urządzeń elektrycznych, Oficyna Wydawnicza PW, 2003.
2. Maksymiuk J., Pochanke Z.: Obliczenia i badania diagnostyczne aparatury rozdzielczej, wyd.1, WNT, 2001.



3. Kulas S., Tory prądowe i układy zestykowe, Wydawnictwo Politechniki Warszawskiej, Warszawa, 2008.
4. Turowski, J., Elektrodynamika techniczna, WNT, Warszawa, 1967.
5. Cholewicki, T. Elektrotechnika teoretyczna cz. II, WNT Warszawa, 1971.

Additional

1. Maksymiuk J., Aparaty elektryczne, PWN, Warszawa, 1995.
2. Normy przedmiotowe.
3. Sprawocznik po rasczietu i konstruowaniu kontaktnych czastiej silnotocznych elektriczeskich aparatow pod red. W.W. Afanasiewa, Energoizdat, Leningrad, 1988.

**Breakdown of average student's workload**

	Hours	ECTS
Total workload	35	1,0
Classes requiring direct contact with the teacher	20	1,0
Student's own work (literature studies, preparation for classes, preparation for tests) <sup>1</sup>	15	1,0

<sup>1</sup> delete or add other activities as appropriate