



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Computerization of design in electrical engineering

### Course

Field of study

Electrical engineering

Area of study (specialization)

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Level of study

First-cycle studies

Form of study

full-time

Year/Semester

2/4

Profile of study

general academic

Course offered in

Polish

Requirements

compulsory

### Number of hours

Lecture

30

Laboratory classes

Tutorials

Projects/seminars

Other (e.g. online)

### Number of credit points

2

### Lecturers

Responsible for the course/lecturer:

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Electronics

3A Piotrowo Street, 60-965 Poznan

Responsible for the course/lecturer:

### Prerequisites

News in mathematics and physics at the matriculation level. Basic knowledge of computer science and programming. Ability to understand and interpret the transmitted messages and effective self-education in the field related to the chosen field of study.

### Course objective

Understanding selected numerical methods in application to solve problems in the field of circuit theory and power engineering, learning examples of tools for design in the field of broadly understood electrical engineering.



## Course-related learning outcomes

### Knowledge

Knows computer methods used for numerical calculations (integration, solving equations and systems of linear, nonlinear and differential equations, basic optimization methods).

### Skills

Is able to apply knowledge of numerical methods to solve selected issues in the field of electrical circuits and power engineering necessary to carry out project tasks.

He can obtain information from literature and the Internet, work individually, solve tasks in the field of design computerization.

### Social competences

Is able to think and act in an entrepreneurial manner in the field of creating IT applications for design in the field of electrical engineering.

## Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Knowledge acquired during the lecture is verified during an exam consisting of 5-10 (open) equally scored questions. Passing threshold: 50% of points. Final issues, on the basis of which questions are prepared, will be sent to students by e-mail using the university e-mail system or through the eKursy system.

## Programme content

Basic issues regarding the implementation of numerical methods in Ms Visual C#. Examples of approximation and interpolation methods and their application in technical issues (e.g. Lagrange interpolation, mean square approximation). Computer methods enabling the analysis of current flow in electric circuits in steady states containing linear elements (Jacobi method, Gauss-Siedl method, SOR simple iteration method) and non-linear (Newton method), as well as in transient states (Euler and Rune-Kutta method).

Basic methods for optimization in technique (e.g. gradient method and genetic algorithm).

the basics of using selected computer programs helpful in designing and simulating electrical systems, e.g. AutoCAD, Matlab Simulink, PSpice, LTSpice, EasyEDA, etc.

Discussion of sample programs used for design in broadly defined electrical engineering.

## Teaching methods

Lecture: multimedia presentation, illustrated with examples on the board, initiating discussions during the lecture. Additional materials will be placed in the eKursy system.

## Bibliography



Basic

1. Spałek D.: Metody numeryczne w elektrotechnice, WPS, Gliwice 2020
2. Fortuna Z., Macukow B., Wąsowski J.: Metody numeryczne, WNT, Warszawa 2015
3. Kącki E., Małolepszy A., Romanowicz A.: Metody numeryczne dla inżynierów, WPŁ, Łódź 2008
4. Pańczyk B., Łukasik E., Sikora J., Guziak T.: Metody numeryczne w przykładach, WPL, Lublin 2012
5. Bolkowski S.: Teoria obwodów elektrycznych, WNT, Warszawa 2017
6. Pikoń A.: AutoCAD 2021 PL. Pierwsze kroki, Helion, Warszawa 2020

Additional

1. John Sharp: Microsoft Visual C# 2017 krok po kroku, APN Promise, Warszawa 2018
2. Guziak T.: Metody numeryczne w elektrotechnice, WPL, Lublin 2002
3. Jaskulski A.: AutoCAD 2021 PL/EN/LT. Metodyka efektywnego projektowania, Helion Warszawa 2020

**Breakdown of average student's workload**

|   | Hours | ECTS |
|---|-------|------|
| Total workload  | 60    | 2,0  |
| Classes requiring direct contact with the teacher   | 35    | 1,0  |
| Student's own work (literature studies, preparation for classes, preparation for exam) <sup>1</sup> | 25    | 1,0  |

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