COURSE DESCRIPTION CARD - SYLLABUS

Course name
Numerical methods

Course

Field of study
Electrical Engineering

Year/Semester
1/2

Area of study (specialization)

Profile of study
practical

Level of study
First-cycle studies

Course offered in
polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
15	15	
Tutorials	Projects/seminars	

Number of credit points

3

Lecturers

Responsible for the course/lecturer:
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Faculty of Control, Robotics and Electrical Engineering

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Responsible for the course/lecturer:

Prerequisites

The student has a knowledge of mathematics (range: linear algebra, differential and integral calculus), and computer science (for programming in high level language).
The student is able to solve math problems analytically within the range specified above.
The student is able to implement a computer program.
The student is aware of the need to expand their competences.
He understands the need for learning.

Course objective

Learning of numerical methods and apply them to solve simple engineering problems in mathematics

and the field of electrical engineering.
The support of engineering calculations by relevant IT tools.

Course-related learning outcomes

Knowledge

1. The student has basic knowledge of numerical methods for solving simple engineering tasks.
2. The student knows at least one computer package supporting numerical calculations.

Skills

1. The student is able to formulate correct algorithm and describe its implementation; He knows at least one programming language.
2. The student is able to choose and apply the correct numerical method to solve simple engineering tasks of a practical nature.
3. The student has the skills of self-education; can perform measurements and computer tests, interpret the results and draw conclusions

Social competences

1. The student knows the limitations of their knowledge and understands the need for further education.
2. The student is aware of the validity of the effects of engineering calculations.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:
Lecture:
* assessment of knowledge and skills in the written form,
* control of perception during lectures.
Laboratory:
* three 15-minute tests as an assessment of the knowledge needed to implement the problems posed in a given area of laboratory tasks,
* colloquium during the last classes (solving problems using algorithms implemented during laboratory classes)
* continuous assessment, during each lesson - rewarding the increase of the ability to use the new methods,
* assessment of knowledge and skills related to the implementation of the tasks.
Obtaining additional points for activity in the classroom, and in particular for:
* proposal to discuss additional aspects of the task;
* the effectiveness of applying knowledge when solving a given problem;
* comments relating to the improvement of teaching materials;

Programme content

Update 31.01.2020.
1. Floating point arithmetic, numerical errors.
2. Stability and accuracy of algorithms.

3. Solutions of nonlinear equations in one variable.
4. The approximation of functions (Interpolation, Taylor series).
5. Numerical integration.

Teaching methods

Lectures:
1.Lecture with multimedia presentation (including: drawings, photos) supplemented by examples given on the blackboard.
2.Lecture conducted in an interactive way of formulating questions to a group of students or indicated specific students.
3.Student activity is taken into account during the course of the assessment.
4.Theory presented in connection with practice.
5.Theory presented in connection with the current knowledge of students,
6.Taking into consideration various aspects of the presented issues,
Laboratories:
1.Laboratories supplemented with multimedia presentations (including drawings, photos).
2.Demonstrations.
3.Computational experiments.

Bibliography

Basic

1. Fortuna, Macukow, Wąsowski, Metody numeryczne, WNT,
2. Kincaid, Cheney, Analiza numeryczna, WNT 2005,
3. Magnucka-Blandzi, Dondajewski, Gleska, Szyszka, Metody numeryczne w MatLabie. Wybrane zagadnienia, Wyd. Politechniki Poznańskiej 2013,

Additional

1. Burden, Faires, Numerical analysis, Prindle, Weber&Schmidt, Boston,
2. Rosłoniec, Wybrane metody numeryczne z przykładami zastosowań w zadaniach inżynierskich, Oficyna Wydawnicza politechniki Warszawskiej 2008

Breakdown of average student's workload

	Hours	ECTS
Total workload	68	3,0
Classes requiring direct contact with the teacher	34	2,0
Student's own work (literature studies, preparation for laboratory classes, preparation for final test)[1]	34	2,0

[1] delete or add other activities as appropriate