

## DESCRIPTION OF THE COURSES

- Course code: ELR2565
- Course title: INFORMATICS IN ELECTRICAL ENGINEERING
- Language of the lecturer: polish

<i>Course form</i>	<i>Lecture</i>	<i>Classes</i>	<i>Laboratory</i>	<i>Project</i>	<i>Seminar</i>
<i>Number of hours/week*</i>	<i>1</i>		<i>1</i>		
<i>Number of hours/semester*</i>	<i>10</i>		<i>10</i>		
<i>Form of the course completion</i>	<i>Final test</i>		<i>Individual programs</i>		
<b>ECTS credits</b>	<i>1</i>		<i>1</i>		
<b>Total Student's Workload</b>	<i>30</i>		<i>30</i>		

- Level of the course (basic/advanced): basic
- Prerequisites: Mathematics, Physics, Electric Circuit Theory, Basic Informatics
- Name, first name and degree of the lecturer/supervisor: Prof. Marian Sobierajski, Ph.D., D.Sc. Associate Professor
- Names, first names and degrees of the team's members: Witold Dzierżanowski, Ph.D., Robert Lis, Ph.D, Mirosław Łabuzem PhD, Robert Łukomski, PhD
- Year:.....3..... Semester:.....5.....
- Type of the course (obligatory/optional): obligatory
- Aims of the course (effects of the course): Skill in Matlab programming in the fields of the analysis of static and dynamic states of linear and non-linear electrical circuits.
- Form of the teaching (traditional/e-learning): traditional
- Course description: Basic matrix and array operations. Principles of creation of scripts and functions. Graphics in Matlab. Designing Graphics User Interfaces. Cooperation with external files. Principles of creation of Matlab functions for solving non-linear equations and non-linear optimization with constraints. Functions of statistics analysis. Making m-files for the analysis of transient states in linear and non-linear circuits..
- Lecture:

<i>Particular lectures contents</i>	<i>Number of hours</i>
1. Using Matlab for electrical engineering calculations – basic matrix and array operations.	2
2. Flow control – if statements, for and while loops, break statements. Saving and loading external matrix data. Principles of scripts creation.	2
3. Plotting curve in Matlab – handle graphics, graphics objects. Designing Graphics User Interfaces – implementation examples in electrical engineering.	2
4. Cooperation with external files – input and output functions. Using Matlab for solution of non-linear equations and optimization with constraints.	2
5. Principles of creation of functions for statistics analysis and curve plotting. Implementation of the methods of integration of differential	2

equations in the fields of transient states in electrical circuits.	
6. Final test.	

- Classes – the contents:

- Seminars – the contents:

1. Starting Matlab in Command Window – matrix and array, basic operations.
2. Making individual script for reading complex data of node matrix from keyboard and computation of node impedance matrix. Making scripts with flow statements: if, for, while and break.
3. Making script for the solution of roots of quadratic equation. Curve plotting with title and legend.
4. Creating Graphics User Interface for export and import of circuit equivalent data from external files.
5. Using Matlab optimization methods for solving non-linear circuits – creating and running relevant scripts and functions.

- Project – the contents:

- Basic literature:

1. Brzózka J. Dorobczyński L., Programowanie w Matlabie, MIKOM, Warszawa 1998.

2. Mrozek B., Mrozek Z., Matlab - uniwersalne środowisko do obliczeń naukowo-technicznych, PFF, Warszawa, 1996.

3. Sobierajski M., Łabuzek M., Programowanie w Matlabie dla elektryków, Wyd. PWr, 2005.

- Additional literature:

1. Zaleski A. Cegiela R., Matlab - obliczenia numeryczne i ich zastosowanie, Nakom Poznań, 1996.

- Conditions of the course acceptance/creditation:

Laboratory - positive note of creating individual programs in Matlab.

Lecture - positive note of final test.

\* - depending on a system of studies