

DESCRIPTION OF THE COURSES

- Course code:ELR1309
- Course title: Mathematics in Electrical Engineering
- Language of the lecture: Polish, English

<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>2</i>			
<i>Number of hours/semester*</i>	<i>15</i>	<i>30</i>			
<i>Form of the course completion</i>	<i>test</i>	<i>test</i>			
<i>ECTS credits</i>	<i>1</i>	<i>2</i>			
<i>Total Student's Workload</i>	<i>30</i>	<i>60</i>			

- Level of the course (basic/advanced): advanced
- Prerequisites: Fundamentals of Electrical Engineering I & II

Name, first name and degree of the lecturer/supervisor:

EDMUND MOTYL, Professor, DSc, PhD, Eng.

- Names, first names and degrees of the team's members:
 - o JANINA POŚPIESZNA PhD, DSc, Eng.
 - o ADAM GUBAŃSKI PhD, Eng.
 - o PRZEMYSŁAW JANIK PhD, Eng.
 - o PAWEŁ KOSTYŁA PhD, Eng.
 - o ZBIGNIEW LEONOWICZ PhD, Eng.
 - o JERZY PIOTROWICZ PhD, Eng.
 - o JACEK REZMER PhD, Eng.
 - o PIOTR RUCZEWSKI PhD, Eng.
 - o TOMASZ SIKORSKI PhD, Eng.
 - o BRONISŁAW ŚWISTACZ PhD, Eng.
 - o JAROSŁAW SZYMAŃDA PhD, Eng.
 - o ZBIGNIEW WACŁAWEK PhD, Eng.

- Year:.II Semester:4
- Type of the course (obligatory/optional): obligatory
- Aims of the course (effects of the course):

The course is a synthesis of the problem solving methods acquired within the scope of applied electro-technics and electrotechnology. Extending the ability of the selection of right mathematical techniques and of the decision making when designing on the engineering level is a basic aim of classes.

- Form of the teaching (traditional/e-learning): traditional
- Course description:

Calculations on the set of complex numbers, the transformations on the complex plane. Conversion using chosen integral transformations (Laplace and Z). Basic definitions and statements. Applying complex functions in solving transitional states of the electric circuits.

Exponential functions and their applications in developing Fourier series expansion. Chosen issues of the matrix calculations. Functions of many variables. Differential operators: the divergence, the gradient and the rotation in field calculations.

- Lecture:

<i>Particular lectures contents</i>	<i>Number of hours</i>
1. Calculations on the set of complex numbers, the transformation on the complex plane.	2
2. Transformations on the complex plane using chosen integral transformations (Laplace and Z). Basic definitions and statements.	2
3. Applying complex functions in solving transitional states of the electric circuits.	2
4. Exponential functions and their meaning in Fourier series expansion.	2
5. Differential and difference equations. Stability of linear and discrete circuits and systems.	2
6. Selected problems of matrix calculations.	2
7. Functions of many variables. Differential operators: the divergence, the gradient and the rotation in field calculations.	2
8. Test	1

- Classes – the contents:

Lecture exercises constitute supplementing lecture problems, above all of engineering tasks within the scope of raising the ability of choice of methods and mathematical techniques. All topics are realized in the context of practical problems within the scope of applied electro-technics and electrotechnology.

- Seminars – the contents:
- Laboratory – the contents:
- Project – the contents:
- Basic literature:
 - o W.Żakowski, W.Leksiński, Matematyka- cz. IV, Seria: Podręczniki Akademickie, WNT Warszawa,
 - o T. Kaczorek, Macierze w Automatyce i Elektrotechnice, WNT Warszawa,
 - o Web-based teaching material ZET PWR available at: <http://eportal.eny.pwr.wroc.pl>
- Additional literature:
 1. F. Leja, Funkcje Zespólone, PWN Warszawa.
 2. E. Kącki, Równania różniczkowe cząstkowe w zagadnieniach fizyki i techniki, WNT Warszawa.
- Conditions of the course acceptance/creditation: Obtaining the positive grade from the lecture test and lecture exercises.

* - depending on a system of studies