DESCRIPTION OF THE COURSES

- Course code: ARR1311
- Course title: Fundamentals of Electrical Engineering
- Language of the lecturer: Polish

Course form	***Lecture***	***Classes***	***Laboratory***	***Project***	***Seminar***
*Number of hours/week**	*2*	*1*			
*Number of hours/semester**	*30*	*15*			
Form of the course completion	*colloquium*	*colloquium*			
ECTS credits	*3*	*2*			
Total Student's Workload	*90*	*60*			

- Level of the course (basic/advanced): basic
- Prerequisites: Mathematics and Physics from the middle school.
- Name, first name and degree of the lecturer/supervisor: Janina Pospieszna, D.Sc., PhD.
- Names, first names and degrees of the team's members:

1. Edmund Motyl Prof. , D.Sc.
. Przemysław Janik Ph.D.
2. Paweł Kostyła Ph.D.
3. Zbigniew Leonowicz Ph.D.
4. Tomasz Sikorski Ph.D.
5. Piotr Ruczewski Ph.D.
6. Zbigniew Wacławek Ph.D.

- Year:.I..... Semester:.....1.....
- Type of the course (obligatory/optional): obligatory
- Aims of the course (effects of the course): Knowledge of fundamental elements and laws of electric circuits range. Ability of currents calculation in simple direct current resistive circuits using different methods. Skills of basic parameters of electric and magnetic field calculation.
- Form of the teaching (traditional/e-learning): traditional
- Course description: Fundamental elements and laws of electric circuits. Methods of electric circuits solution. Electric and magnetic field. Induction vector of the electric and magnetic field. Rotation and sourcelessness. Intensity of the energy. Charge movement in electric and magnetic field. Electric field in magnetic materials. Elements with ferromagnetic cores
- Lecture:

Particular lectures contents	*Number of hours*
1. Introduction. Basic quantities and units	2
2. Elements of electrical circuits: resistance, capacitance, inductance.	2
3. Inductive elements with ferromagnetic cores. Commutation laws.	2
4. Basic laws of electrical circuits. Ohms law and Kirchhoffs laws. Topology	2

of electrical circuits. Principle of superposition.	
5. Solution methods of electrical circuits with constant voltage sources. Methods of loop currents and node potentials.	2
6. Equivalent systems**.** Notion of the equivalence of multi-terminal systems. The triangle-star transformation. Thevenins theorem.	2
7. Solving equations describing simple circuits with elements RLC. Steady state analysis.	2
8. Electric and magnetic fields. Scalar and vector fields.	2
9. Induction vector of electric and magnetic fields.	2
10. Sourceness of the electric field. Gauss's law. Energy intensity of electric field.	2
11. Rotationality of the magnetic field. Energy intensity of magnetic field.	2
12. Movement of electric charges in electric and magnetic field.	2
13. Electric field in the matter: gas, fluids. Dielectrics and semiconductors.	2
14. Magnetic field in the matter. Classification of magnetic materials.	2

- Classes – the contents:

  Calculation of potential and flux of the electric field on the basis of Coulomb's law. Capacitance calculation of simple condensers. Calculation of magnetic induction in the arrangement of two conductors with current. Currents calculation in simple direct current resistive circuits using different methods.
- Seminars – the contents:
- Laboratory – the contents:
- Project – the contents:
- Basic literature:

  1. Oleg D. Jefimenko-Electricity and Magnetism: An Introduction to the Theory of Electric and Magnetic Fields, 2nd edition, 1989

  2. Leonard S. Bobrow - Fundamentals of Electrical Engineering (Oxford Series in Electrical and Computer Engineering), 1996
- Additional literature:

  1. William D. Stanley, John R. Hackworth, and Richard L. Jones - Fundamentals of Electrical Engineering and Technology, 2006.

  2. Charles K. Alexander, Matthew N. O. Sadiku- Fundamentals of Electric Circuits, Prentice Hall; 8 edition , 2006.
- Conditions of the course acceptance/credition: Passed two colloquiums.

***** - depending on a system of studies