

FACULTY OF ELECTRICAL  
ENGINEERING**SUBJECT CARD**

Name in Polish: **Podstawy elektrotechniki**  
 Name in English: **Fundamentals of electrical engineering**  
 Main field of study (if applicable): **Control Engineering and Robotics**  
 Specialization (if applicable):  
 Level and form of studies: **1st level, full-time**  
 Kind of subject: **obligatory**  
 Subject code: **ARR041312**  
 Group of courses: **NO**

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU):	30	15			
Number of hours of total student workload (CNPS):	90	60			
Form of crediting:	crediting with grade	crediting with grade			
For group of courses mark (X) final course:					
Number of ECTS points:	3	2			
including number of ECTS points for practical (P) classes :		2			
including number of ECTS points for direct teacher-student contact (BK) classes:	2.10	1.40			

**PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES**

1. He has the fundamental knowledge in terms of mathematics and physics upon the lower school level.

**SUBJECT OBJECTIVES**

- C1. The purpose of this education is to be able to find some ways of description and analysis for the circuit  
 C2. The purpose of this education is to be able to determine some fundamental laws of the electric and magnetic field

**SUBJECT EDUCATIONAL EFFECTS***relating to knowledge:*

- PEK\_W01 The student knows the fundamental laws and methods for solutions of the circuits  
 PEK\_W02 The student knows the fundamental laws of the electric and magnetic field.

*relating to skills:*

- PEK\_U01 The student is able to define and to solve some equations describing linear circuit  
 PEK\_U02 The student can determine the electric field intensity, the current and the magnetic field intensity for the given charge distributions as well as the given currents

*relating to social competences:*

- PEK\_K01 The student is able to think in a creative way.

PROGRAMME CONTENT		
Form of classes - lecture		Number of hours:
Lec 1	Some fundamental quantities and units of electric field and circuit. The elements of circuit. Some fundamental laws of circuit: Ohms' law and Kirchhoff's laws	2
Lec 2	The transformation circuit concept	2
Lec 3	The Maxwell current method	2
Lec 4	The potential node concept	2
Lec 5	The superposition theorem	2
Lec 6	Selected problems of the circuit topology	2
Lec 7	The Thevenin theorem	2
Lec 8	The electric field source. The Gauss's law	2
Lec 9	The scalar and vector field. The electric field	2
Lec 10	The rotation problem for magnetic field.	2
Lec 11	The Ampere's law	2
Lec 12	The charge flow through the electric field. The electric field into materials	2
Lec 13	The charge flow through the magnetic field. The inductance.	2
Lec 14	The steady state into the RLC linear circuit with the sinusoidal time function source	2
Lec 15	The final written test.	2
Total hours:		<b>30</b>

Form of classes - class		Number of hours:
Cl 1	The electric field.	2
Cl 2	The magnetic field.	2
Cl 3	The circuit elements	2
Cl 4	The fundamental laws for circuits	2
Cl 5	Some solution concepts for circuits	2
Cl 6	The steady state into circuit with the sinusoidal condition	2
Cl 7	The electric charge distributions	2
Cl 8	The final written test.	1
Total hours:		<b>15</b>

TEACHING TOOLS USED
N1. Lecture by traditional forms.
N2. Traditional class form.

EVALUATION OF SUBJECT EDUCATIONAL EFFECTS ACHIEVEMENT		
Evaluation <i>F - forming (during semester)</i> <i>P - concluding (at semester end)</i>	Educational effect number	Way of evaluating educational effect achievement
F1(w)	PEK_W01 PEK_W02	Test
P(w)	P=F1	
F1(c)	PEK_U01 PEK_U02	Test
P(c)	P=F1	

PRIMARY AND SECONDARY LITERATURE
<b>PRIMARY LITERATURE:</b>
[1] Kurdziel R. - Podstawy Elektrotechniki - any edition
[2] Bolkowski S. - Teoria Obwodów Elektrycznych - any edition
[3] Osowski S., Siwek K., Śmiałek M.: Teoria obwodów. Politechnika Warszawska 2006
<b>SECONDARY LITERATURE:</b>
[1] Piątek Z., Jabłoński P.: Podstawy teorii pola elektromagnetycznego. WNT 2010
[2] Bolkowski S., Brociek W., Rawa H.: Teoria obwodów elektrycznych. Zadania. WNT 2007
[3] Łuczycycki A., Skopec A. - Elektryczność i magnetyzm - Skrypt P.Wr. Wrocław 1994

**SUBJECT SUPERVISOR**

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**MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT  
ARR041312 - Fundamentals of electrical engineering  
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY Control Engineering and Robotics**

<b>Subject educational effect</b>	<b>Correlation between subject educational effect and educational effects defined for main field of study and specialization (if applicable)</b>	<b>Subject objectives</b>	<b>Programme content</b>	<b>Teaching tool number</b>
PEK_W01	K1AiR_W16	C.1	Lec1 Lec2 Lec3 Lec4 Lec5 Lec6 Lec7 Lec8 Lec13 Lec14	N.1
PEK_W02	K1AiR_W16	C.2	Lec9 Lec10 Lec11 Lec12	N.1
PEK_U01	K1AiR_U14	C.1	CI1 CI2 CI3 CI4 CI7	N.2
PEK_U02	K1AiR_U14	C.2	CI5 CI6	N.2
PEK_K01	K1AiR_K04	C.1 C.2	Lec1 Lec2 Lec3 Lec4 Lec5 Lec6 Lec7 Lec8 Lec9 Lec10 Lec11 Lec12 Lec13 Lec14 Lec15 CI1 CI2 CI3 CI4 CI5 CI6 CI7 CI8	N.1 N.2