Zał. nr 5 do ZW 16/2020

FACULTY OF ELECTRONICS (W4)

SUBJECT CARD

Name of subject in Polish:	**Elektronika**
Name of subject in English:	**Electronics**
Main field of study (if applicable):	**Electronic and Computer Engineering**
Specialization (if applicable):	**……..**
Profile:	**academic**
Level and form of studies:	**1 st level/ full-time**
Kind of subject:	**obligatory**
Subject code:	**ECEA00003**
Group of courses:	**YES**

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	45	45	30		
Number of hours of total student workload (CNPS)	90	90	60		
Form of crediting	crediting with grade	crediting with grade	crediting with grade		
For group of courses mark (X) final course	**x**				
Number of ECTS points	**8**				
including number of ECTS points for practical classes (P)		3	2		
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)	1,5	1,5	1		

*delete as not necessary

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Differential and integral calculus of one variable.
2. Complex numbers.

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SUBJECT OBJECTIVES

C1 basic knowledge about the methods of analysis of DC and AC circuit and gaining of skills to use these methods.
C2 basic knowledge in the field of logic.

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:
PEU_W01 - have a basic knowledge of methods of analysis for DC and AC circuits.
PEU_W02 - knows the basic theorems of circuit theory,
PEU_W03 - have a basic knowledge of calculus based on Laplace transformation.
PEU_W04 - knows the definitions of transmission system operators, knows the physical meaning of frequency characteristics of the system.
PEU_W05 - knows how to express periodic function as a Fourier series, knows the physical

interpretations of the series; knows the method of linear circuit analysis with periodical excitation.
PEU_W06 - knows the definition and concept of four-terminal network, has a basic knowledge of how to describe four-terminal networks using their internal parameters.
PEU_W07 - knows the concept of the transmission line and phenomena occurring in it.
PEU_W08 - knows the principles of elementary logic circuits.

relating to skills:
PEU_U01 - is able to analyze elementary DC and AC sinusoidal excited circuits.
PEU_U02 - can use symbolic method for the elementary analysis of linear circuits.
PEU_U03 - can determine the frequency characteristics of the system and analyze transients.
PEU_U04 - can nominate Fourier coefficients of a periodic function, can determine the power and RMS value of periodic signal based on discrete amplitude spectrum.
PEU_U05 - is able to describe a two-port circuits with a proper matrix.
PEU_U06 - can analyze elementary logic circuits.

relating to social competences:

PROGRAMME CONTENT

Lecture		**Number of hours**
Lec 1	Voltage and Current, Resistance, Ohm's Law, Power, and Energy	2
Lec 2	Network Theorems	2
Lec 3	Capacitors, Inductors, Magnetic Circuits	2
Lec 4,5	Sinusoidal Alternating Waveforms. The Basic Elements and Phasor Methods	4
Lec 6	Series and Parallel ac Circuits, Series-Parallel ac Networks Methods of Analysis (ac)	2
Lec 7	Network Theorems (ac), Power (ac	2
Lec 8	Resonance	2
Lec 9	Transformers	2
Lec10,11	Polyphase Systems	4
Lec 12	Transient analysis, time response	2
Lec 13	Transient analysis	2
Lec 14	Pulse Waveforms and the R-C Response	2
Lec15,16	Non-sinusoidal Circuits (Fourier series)	4
Lec 18	Transfer function; Decibels, Filters, and Bode Plots	2
Lec 19	Two port circuits	3
Lec 20	Transmission lines (Distributed parameter systems)	2
Lec 21	Digital logic, (gates, flip-flops)	2
Lec22,23	Summary	4
	Total hours	**45**

Classes		**Number of hours**
Cl 1,2	Analysis of elementary DC circuits.	4
Cl 3,4	Physical laws in electrotechnics ; KVL and KCL, current loop analysis and voltage node analysis	4

Cl 5,6	sinusoidal excitation analysis of AC circuits (complex numbers)	4
Cl 7,8	Thévenin i Norton theorems and superposition rule application	4
Cl 9,10	Power factor compensation, power matching.	4
Cl 11,12	Fourier series practice	4
Cl 13,14	Two-port circuits, internal and external parameters	4
Cl 15	Simple circuits analysis by means of differentia equations	3
Cl 16,19	operational method of analysis of linear circuits	8
Cl 20	Frequency response of a circuit. Bode plot.	2
Cl 21,22	Analysis and synthesis of elementary logical circuits	4
	Total hours	**45**

Laboratory		**Number of hours**
Lab 1	Introduction	2
Lab 2	Basic circuits theorems	4
Lab 3	Operator transmittance; transient analysis	4
Lab 4	Two-port circuits parameters measurements	4
Lab 5	Fourier series	4
Lab 6	Transmission line model	4
Lab 7	Logical circuits, Gates and flip-flops.	4
Lab 8	Summary.	4
	Total hours	**30**

TEACHING TOOLS USED
N1.Chalk board N2. Projector, computer with PowerPoint N3. Lab stand N4. Self-study N5. Consultations N6. Two person team work (in special cases 3 persons team)

EVALUATION OF SUBJECT LEARNING OUTCOMES ACHIEVEMENT

Evaluation (F – forming during semester), P – concluding (at semester end)	Learning outcomes code	Way of evaluating learning outcomes achievement
F1	PEU_W01- PEU_W08	test
F2	PEU_U01- PEU_U06	Oral answers and/or quizzes and/or final test
F3	PEU_U01- PEU_U06	Quizzes, lab work, reports
P = (F1+F2+F3)/3; all F1, F2 i F3 must be positive		

PRIMARY AND SECONDARY LITERATURE
PRIMARY LITERATURE: [1] R. L. Boylestad – Introductory Citcuits Analysis, Pearson, Prentice Hall, 2012 11th edition **SECONDARY LITERATURE:** [1] S. Osowski, K. Siwek, M. Śmiałek – Teoria obwodów, Wydawnictwo Politechniki Warszawskiej, 2006 [2] W. Wolski, Teoretyczne podstawy techniki analogowej, Wydawnictwo PWr, 2007, [3] Literature suggested during classes.
SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)
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