Zał. nr 5 do ZW 16/2020

FACULTY ELECTRONIC

SUBJECT CARD

Name of subject in Polish:	**Fizyka dla elektroników**
Name of subject in English:	**Physics for 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:	**ECEA00014**
Group of courses:	**YES**

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	30	30			
Number of hours of total student workload (CNPS)	90	90			
Form of crediting	crediting with grade	crediting with grade			
For group of courses mark (X) final course	**x**				
Number of ECTS points	**6**				
including number of ECTS points for practical (P) classes		3			
including number of ECTS points corresponding to classes that require direct participation of lecturers and other academics (BU)	1	1			

*delete as applicable

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

Differential and integral calculus of one variable, the basics of differential and integral calculus of several variables, vectors in the plane and space complex numbers..

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SUBJECT OBJECTIVES

C1 Gaining additional knowledge of mathematics necessary to understand the laws of electromagnetism,

C2 Understanding the laws and physical mechanisms of electric and magnetic fields in vacuum and in materials.

C3 Knowledge of the value of physical constants describing the phenomena's of electromagnetism in materials.

C4 Gaining knowledge of a plane wave, wave propagation in various mediums, and the laws governing the phenomena of reflection and refraction of electromagnetic waves.

C5 Obtaining knowledge about the practical aspects of electromagnetism important in engineering practice.

SUBJECT LEARNING OUTCOMES

relating to knowledge:

PEU_W01 – knows the basic operational calculus

PEU_W02 - knows the laws and phenomena of the electriostatic field

PEU_W03 - knows the laws and phenomena of the steady magnetic field and the Maxwell equations

PEU_W04 - knows the parameters and structure of a plane wave, reflection and refraction of a plane wave

PEU_W05 - understanding the practical aspects of electromagnetic phenomena relevant to engineering practice.

relating to skills:

PEU_U01 - can use the laws of electromagnetism to explain aspects of engineering practice

PEU_U02 - can use basic formulas to calculate the field distribution, resistance, capacitance and inductance of physical objects

PEU_U03 - is able to recognize and define the physical phenomena associated with electromagnetism.

relating to social competences:

PROGRAMME CONTENT

Form of classes - lecture		**Number of hours**
Lec1	Vector algebra, coordinate systems, vector calculus– review.	2
Lec2- Lec5	Electrostatic field; Coulmb,s law, Gauss's law,	8
Lec6 - Lec7	The current; Ohm law, Poisson's and Laplace,, resistivity	4
Lec8 - Lec9	Magnetic field; Biot-Savart' law, Amper's law, Faraday's law; forces in magnetic field, inductance, transformer.	4
Lec10 - Lec11	Elements of electrodynamic; Maxwell equasions, dipol, plane wave,	4
Lec12 - Lec14	Electromagnetic wave propagation, waveguides, reflection and refraction	6
Lec15	Resume	2
	Total hours	**30**

Classes		**Number of hours**
Cl1 – Cl5	Calculation of electric field and potential distribution	10
Cl6 - Cl7	Calculation of capacitance and resistance of the objects	4
Cl8 – Cl10	Calculation of magnetic field distribution and inductance	6
Cl11 – Cl14	Calculation of electromagnetic wave parameters, reflection and refraction	8
Cl15	Resume	2
	Total hours	**30**

TEACHING TOOLS USED

N1. Chalkboard - clarification of the lows in the form of drawings,

N2. Practical demonstrations of technical elements associated with electromagnetism

N3. Consultation,

N4 Self-studies of issues described during lectures..

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_W05	Final test
F2	PEU_U01 – PEU_U03	Quizzes and/or final test
C=0.51*F1 + 0.49*F2; F1 and F2 must be positive		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] M. N. O. Sadiku, Elements of Electromagnetics, Oxford Press, 3rd edition, 2001.
[2] E. M. Purcell, Electrcity and Magnetizem, McGraw Hill.

SECONDARY LITERATURE:

[3] J. Witkowski: Jak rozwiązywać zadania z elektromagnetyzmu -skrypt
[4] W. Michalski: Elektryczność i magnetyzm, zbiór zagadnień i zadań cz.1, 2, 3, Oficyna Wydawnicza Politechniki Wrocławskiej, 2009
[5] M. Karkowski: Elektrotechnika teoretyczna cz. 2, Wydawnictwo Naukowe PWN, 1995
[6] W. Michalski, R. Nowicki – Zbiór zagadnień i zadań z teorii pola, elektromagnetycznego, , Oficyna Wydawnicza Politechniki Wrocławskiej, 1995
[7] D.J. Griffiths ; Podstawy elektrodynamiki, Wydawnictwo Naukowe PWN, 2005

SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)

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