GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Emission and immunity to electromagnetic radiation in biomedical equipment, PG_00053347		
Field of study	Biomedical Engineering, Biomedical Engineering, Biomedical Engineering		
Date of commencement of studies	February 2022	Academic year of realisation of subject	2022/2023
Education level	second-cycle studies	Subject group	Optional subject group Subject group related to scientific research in the field of study
Mode of study	Full-time studies	Mode of delivery	at the university
Year of study	2	Language of instruction	Polish
Semester of study	3	ECTS credits	2.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Metrology and Optoelectronics -> Faculty of Electronics, Telecommunications and Informatics		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Stanisław Galla	
	Teachers	dr inż. Stanisław Galla mgr inż. Kamil Osiński	

Lesson type and method of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	0.0	15.0	0.0	30

E-learning hours included: 0.0

Learning activity and number of study hours

Learning activity	Participation in didactic classes included in study plan	Participation in consultation hours	Self-study	SUM
Number of study hours	30	3.0	17.0	50

Subject objectives

The student identifies the sources of electromagnetic disturbances and is able to describe them using known mathematical apparatus. It defines the ways of penetration of disturbances into given systems. Selects anti-interference elements and is able to simulate their use. Prepares the required technical documentation and measures the basic characteristics of the tested device in the field of electromagnetic compatibility.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_U05] can plan and conduct experiments related to the field of study, including computer simulations and measurements; interpret obtained results and draw conclusions	The student is able to describe the occurring electromagnetic disturbances using a mathematical apparatus. He can perform simulations of occurring disturbances and assess their regularity.	[SU1] Assessment of task fulfilment
[K7_U01] can apply mathematical knowledge to formulate and solve complex and non-typical problems related to the field of study by:n-appropriate selection of source information and its critical analysis, synthesis, creative interpretation and presentation,n-application of appropriate methods and toolsn	The student is able to indicate the sources of disturbances in the systems, can indicate their ways of penetration. Depending on the disturbances, it selects anti-interference elements. Is able to complete the technical documentation to meet the requirements of electromagnetic compatibility The student is able to identify the main parameters of circuits. Can carry out basic electromagnetic compatibility tests. Is able to evaluate the obtained results of electromagnetic compatibility tests.	[SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment
[K7_W02] Knows and understands, to an increased extent, selected laws of physics and physical phenomena, as well as methods and theories explaining the complex relationships between them, constituting advanced general knowledge in the field of technical sciences related to the field of study	The student is able to identify the main parameters of circuits. Can carry out basic electromagnetic compatibility tests. Is able to evaluate the obtained results of electromagnetic compatibility tests	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge

<table>
<tr><td>Subject contents</td><td colspan="2">1. Introduction to EMC. 2. Basic requirements included in the New Approach Directives. 3. Medical Directives, Electromagnetic Compatibility. 4. Basic EMC research with mathematical description of basic disturbing signals and methods of their simulation. 5. Basic anti-interference elements and protective methods of their selection. 6. Principles of grounding and shielding. 7. Basic design methods using aspects of electromagnetic compatibility.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td colspan="2">Knowledge of the basics of electromagnetic compatibility (EMC).</td></tr>
<tr><td>Assessment methods and criteria</td><td colspan="2"><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td></td><td>50.0%</td><td>50.0%</td></tr>
<tr><td></td><td>50.0%</td><td>50.0%</td></tr>
</table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>Henry W. Ott Electromagnetic Compatibility Engineering ISBN 0470189304

David A. Weston Electromagnetic Compatibility: Methods, Analysis, Circuits, and Measurement

Yang Zhao, Wei Yan, Jun Sun, Mengxia Zhou, Zhaojuan Meng, Electromagnetic Compatibility: Principles and Applications ISBN 978 981 16</td></tr>
<tr><td>Supplementary literature</td><td>Henry W. Ott Electromagnetic Compatibility Engineering ISBN 0470189304

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<tr><td>eResources addresses</td><td></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="2"></td></tr>
<tr><td>Work placement</td><td colspan="2">Not applicable</td></tr>
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