GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Electromagnetic Compatibility of Medical Equipment, PG_00049348		
Field of study	Biomedical Engineering		
Date of commencement of studies	October 2023	Academic year of realisation of subject	2026/2027
Education level	first-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	4	Language of instruction	Polish
Semester of study	7	ECTS credits	2.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Biomedical Engineering -> Faculty of Electronics, Telecommunications and Informatics		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Adam Bujnowski	
	Teachers	dr inż. Adam Bujnowski	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	15.0	0.0	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	2.0	18.0	50

Subject objectives

The goal of the subject is to familiarize students with the electromagnetic compatibility issues. There will be shown and categorized typical sources of noise signals and coupling methods. There will be shown basic norms related to the EMC and tupical design approaches to improve devices functionality in presence of EMC disturbances.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_K02] is ready to critically assess possessed knowledge and acknowledge the importance of knowledge in solving cognitive and practical problems	Student knows risk and analyses risk of lack of the EMC	[SK5] Assessment of ability to solve problems that arise in practice
[K6_U08] while identifying and formulating specifications of engineering tasks related to the field of study and solving these tasks, can:n- apply analytical, simulation and experimental methods,n- notice their systemic and non-technical aspects,n- make a preliminary economic assessment of suggested solutions and engineering work n	Student can analyse and identify EMC problems Student uses analytic tools to evaluate EMC problems	[SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools
[K6_W06] Knows and understands the basic processes occurring in the life cycle of devices, facilities and systems specific to a given field of study.	Student knows basic issues with distorion sources and coupling methods Student knows basisc norm in area of EMC Student knows basic design rules to comply with EMC	[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects

Subject contents	Principal terms foe electromagnetic compatibility Norms and regulations in Poland, EU and worldwide Distribution of electromagnetic waves Interferences in elecronic equipment, coupling and methhods of coupling Immunity measurement for ESD immunity tests for strong magnetic fields Immunity tests Immunity tests for short electriv pulses and electric discharges Immunity tests for short interrupts and fallouts of electric supply Emmityvity measurements in the EMC. Echoless chambers Instrumentation fot the EMC Typical techniques of improving and assuring of the EMC
Prerequisites and co-requisites	

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
final writting	50.0%	50.0%
laboratory achievevements	50.0%	50.0%

Recommended reading	
Basic literature	Paul C.R.: Electromagnetic Compatibility, John Wiley & Sons, 1992. Perez R.: Handbook of electromagnetic compatibility, Academic Press, 1995.
Supplementary literature	Więckowski Tadeusz Wiesław: Badania kompatybilnoci elektromagnetycznej urz'dze& elektrycznych i elektronicznych; Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 2001. Więckowski Tadeusz Wiesław: Pomiar emisyjności urządzeń elektrycznych i elektronicznych; Wrocław: Politechnika Wrocławska, 1997
eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	Show typical coupling methods Explain selectet sources of noise Propose circuit for ellimination surges in the signal line Explain importance of galvanic separation and show typical solution Explain basic shielding techniques

Work placement	Not applicable