GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Generation and detection of magnetic fields, PG_00047940		
Field of study	Biomedical Engineering, Biomedical Engineering, Biomedical Engineering		
Date of commencement of studies	October 2024	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	3	Language of instruction	Polish
Semester of study	5	ECTS credits	1.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Solid State Physics -> Faculty of Applied Physics and Mathematics		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Marek Augustyniak	
	Teachers		

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	0.0	0.0	0.0	15

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	15	1.0	9.0	25

Subject objectives

Student knows basic definitions of magnetism and processes used for generation of staic and alternative magnetic field. He recognises sources of magnetic fields and knows methods of field measurement. Student is able to understand principles of application of magnetic fields in medicine.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W02] knows and understands, to an advanced extent, selected laws of physics and physical phenomena as well as methods and theories explaining the complex relationships between them, constituting the basic general knowledge in the field of technical sciences related to the field of study	He/she understands magnetic phenomena in materials at the macroscopic level, such as ferro-/para- and diamagnetism, Lorenz force, Maxwell's equations taking into account the specificity of different frequency ranges, analogies between the flux of the magnetic field and electric current. He/she can list available magnetic field detectors and define the physical principle of their operation. He/she is able to independently acquire and critically verify new knowledge related to magnetic phenomena and their applications.	[SW3] Assessment of knowledge contained in written work and projects
[K6_U04] can apply knowledge of programming methods and techniques as well as select and apply appropriate programming methods and tools in computer software development or programming devices or controllers using microprocessors or programmable elements or systems specific to the field of study	He/she can use, at least to a basic degree, computer tools to predict the distribution of magnetic fields obtained with different generation methods (coils, permanent magnets).	[SU1] Assessment of task fulfilment

<table>
<tr><td>Subject contents</td><td>1. Introduction to magnetism. 2. Magnetic field descriptors and their definitions. 3. Proprties of dia-para and ferromagnetic materials. 4. Principles of methods of magnetic field generation. 5. Magnetic circuits. 6. Methods of magnetic field detection. 7. Application of magnetic fields in medicine.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td></td></tr>
<tr><td>Assessment methods and criteria</td><td>
<table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>written egzam</td><td>50.0%</td><td>50.0%</td></tr>
<tr><td>participatiion</td><td>50.0%</td><td>50.0%</td></tr>
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<tr><td>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td>[1] Introduction to magnetism and magnetic materials; D. Jiles, Chapman and Hall, London, 1991</td></tr>
<tr><td>Supplementary literature</td><td>www.JMMM.com</td></tr>
<tr><td>eResources addresses</td><td>Adresy na platformie eNauczanie:</td></tr>
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</td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>Magnetic field descriptors and their definitions. Properties of dia-para and ferromagnetic materials. Methods of magnetic field generation. Magnetic circuits. Methods of magnetic field detection. Application of magnetic fields in medicine.</td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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