GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	, PG_00053506		
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	6	ECTS credits	4.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Division of Complex Systems Spectroscopy -> Institute of Physics and Applied Computer Science -> Faculty of Applied Physics and Mathematics		
Name and surname of lecturer (lecturers)	Subject supervisor	dr Brygida Mielewska	
	Teachers		

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	15.0	0.0	15.0	0.0	45

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	45	5.0	50.0	100

Subject objectives

Acquainting students with physical quantities and types of calculations typical for dosimetry and radiation protection as well as quality control in radiology

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U02] can perform tasks related to the field of study in an innovative way as well as solve complex and nontypical problems, applying knowledge of physics, in changing and not fully predictable conditions	Student is able to calculate the dose absorbed from various types of radiation; Student understands how to use radiation shielding and is able to design them	[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools
[K6_U03] can design, according to required specifications, and make a simple device, facility, system or carry out a process, specific to the field of study, using suitable methods, techniques, tools and materials, following engineering standards and norms, applying technologies specific to the field of study and experience gained in the professional engineering environment	Student is able to design a specific shieldings and test its shielding parameters in accordance with the applicable standards	[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools
[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	Student knows and understands the mechanisms of interaction of various types of radiation with tissues	[SW2] Assessment of knowledge contained in presentation [SW3] Assessment of knowledge contained in written work and projects

<table>
<tr><td>Subject contents</td><td>Lectures and problems::

1. Fundamentals of nuclear physics. 2 Principles, quantities and units of radiological protection. 3. Radiation dose limits. 4. Specificity of interaction of different types of radiation with tissue. 5. Types of ionizing radiation sources. 6. Radiation shields, multiplicity for wide and collimated beam. 7. Internal exposure assessment. 8. Categories of employees, controlled and supervised area. 9. Classification of radioactive waste. 10. Consent to launch the workshop. 11. Emergency plan. 12. Quality control of radiation sources in medicine.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Nuclear Physics basic course</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>project</td><td>50.0%</td><td>50.0%</td></tr>
<tr><td>problem solving</td><td>50.0%</td><td>50.0%</td></tr>
</table></td></tr>
<tr><td>Recommended reading</td><td><table>
<tr><td>Basic literature</td><td>Klaus Grupen "Introduction To Radiation Protection" 2010</td></tr>
<tr><td>Supplementary literature</td><td>Herman and Cember "Introduction to Health Physics" McGrawHill Medical</td></tr>
<tr><td>eResources addresses</td><td>Adresy na platformie eNauczanie:</td></tr>
</table></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>A radioactive material possesses an approximately constant gammaactivity of 1GBq. Per decay 1.5MeV are liberated. What is the dailyenergy dose if the ionizing radiation is absorbed in an amount ofmaterial of mass m = 10 kg?</td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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