GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Nuclear Medicine and Radiotherapy, PG_00053526		
Field of study	Biomedical Engineering		
Date of commencement of studies	October 2023	Academic year of realisation of subject	2025/2026
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	3.0
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	Jerzy Nowak	
	Teachers		

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	15.0	0.0	0.0	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	4.0	26.0	75

Subject objectives

To show the techniques and applications of radioisotopes and ionizing radiation in diagnostics and therapy. To describe mechanisms of interaction of radiation with biologic matter, measurements of beams parameters and its influence in organism.

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	knows the applications of ionizing radiation sources in diagnostics and therapy	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge
[K6_U05] can plan and conduct experiments related to the field of study, including computer simulations and measurements; interpret obtained results and draw conclusions	is able to perform typical calculations in the field of radiotherapy and nuclear medicine, performs a critical analysis of the results and formulates conclusions about the possible risks to the patient and staff	[SU5] Assessment of ability to present the results of task [SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment

<table>
<tr><td>Subject contents</td><td>LECTURE: Radioactive dacay and radioisotopes excretion.

Radiopharmaceuticals, Manufacturinf of radioisotopes,

Imaging techniques In nu clear medicine, Physicsal bases of radiotherapy, Interaction of radiation with matter. Radiobiological bases of radiotherapy, X-lamps for therapeutic applications, Gamma therapy accelarators, Therapeutic accelerators, Dosymetric parameters of photon beam, Beam profile and correcting factors, Patient treatment in radiotherapy, preatment planning, Brachytherapy, Dosymetry in radiotherapy ionizing chambers and other detectors,

Bragg-Grays law, Fanos law, Quality insurance in radiotherapy.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Physics - elementary course Mathematics - differentials, integrals Chemistry - periodic system of the elements, chemical bonds, types of chemical reactions, Biophysics</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>6 written tests during semester</td><td>50.0%</td><td>50.0%</td></tr>
<tr><td>written exam</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>1. Nałęcz M. (pod red.), Biocybernetyka i inżynieria biomedyczna 2000, t.1 Biosystemy, Akademicka Oficyna Wydawnicza EXIT, Warszawa 2002 2. Nałęcz M. (pod red.), Biocybernetyka i inżynieria biomedyczna 2000, t.2 Biopomiary, Akademicka Oficyna Wydawnicza EXIT, Warszawa 2002 3. Nałęcz M. (pod red.), Biocybernetyka i inżynieria biomedyczna 2000, t.9 Fizyka Medyczna, Akademicka Oficyna Wydawnicza EXIT, Warszawa 2002</td></tr>
<tr><td>Supplementary literature</td><td>Johns H.E, Cunningham J.R. Physics of Radiology, HC. Thomas Publisher, 1976</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>How does an isotope generator work?

Models of cell survival in radiotherapy</td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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