GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Selected Issues of Human Radiobiology, PG_00050106		
Field of study	Biomedical Engineering		
Date of commencement of studies	October 2025	Academic year of realisation of subject	2027/2028
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	Institute of Physics and Applied Computer Science -> Faculty of Applied Physics and Mathematics -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr Brygida Mielewska	
	Teachers		

Lesson types

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

To familiarize students with the issues of radiation interaction with biological matter and with assessment methods and radiobiological models and their application in radiotherapy.

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	The student understands the effects of ionizing radiation on matter and its impact on biological systems. The student describes basic radiobiological mechanisms and models and how they are used in radiotherapy and radioprotection.	[SW1] Assessment of factual knowledge
[K6_W51] Knows and understands, to an advanced extent, selected aspects of biomedical diagnostics and human anatomy and physiology, constituting general knowledge related to the field of study	The student knows research methods od radiobiology and the effects of ionizing radiation on selected types of cells, tissues and organs (e.g. radiation sickness)	[SW2] Assessment of knowledge contained in presentation

<table>
<tr><td>Subject contents</td><td>Course content – lecture
1. Physics and chemistry of radiation absorption
2. Dosimetric quantities
3. Radiological models and radiation protection
4. LET and relative biological effectiveness
5. Molecular mechanisms of DNA and chromosome damage and repair
6. Cell survival curves
7. Radiosensitivity of cells in different developmental phases
8. Fractionated radiation and dose rate
9. Oxygen effect and reoxygenation
10. Acute radiation syndrome
11. The 6 Rs of radiotherapy
12. Radioprotectors and countermeasures against radiation effects</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>No requirements</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>final exam</td><td>50.0%</td><td>100.0%</td></tr></table></td></tr>
<tr><td>Recommended reading</td><td><table><tr><td>Basic literature</td><td>Radiobiology Textbook, ed Sarah Baatout, Springer 2023 Open Access</td></tr><tr><td>Supplementary literature</td><td>Eric J. Hall, Radiobiology for Radiologists, Wolters Kluwer 2019</td></tr><tr><td>eResources addresses</td><td></td></tr></table></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>1. LET and Relative Biological Effectiveness 2. Cell Survival Curves 3. The 6 Rs of Radiotherapy</td></tr>
<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
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