GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Planning of radiation therapy, PG_00053352		
Field of study	Biomedical Engineering, Biomedical Engineering, Biomedical Engineering		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2025/2026
Education level	second-cycle studies	Subject group	Optional subject group Specialty 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	2	Language of instruction	Polish
Semester of study	4	ECTS credits	2.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	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	0.0	0.0	15.0	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 aim of the course is to present the current methods and tools for treatment planning in radiotherapy with the use of photos, electrons as well as with ions and neutrons

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_U03] can design, according to required specifications, and make a complex 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 works with the codes of practise and protocols in radiotherapy	[SU4] Assessment of ability to use methods and tools
[K7_U12] is able, to an increased extent, to analyze the operation of components and systems related to the field of study, as well as to measure their parameters and study their technical characteristics, and to plan and carry out experiments related to the field of study, including computer simulations, interpret the obtained results and draw conclusions	Student is able to perform typical measurements of accelerator characteristics and activities related to the exposure planning process	[SU1] Assessment of task fulfilment
[K7_W10] knows and understands, to an increased extent, the basic processes occurring in the life cycle of equipment, objects and technical systems, as well as methods of supporting processes and functions, specific to the field of study	Student is able to discuss the structure of a medical accelerator and the role of individual elements of radiation systems	[SW1] Assessment of factual knowledge

Subject contents	1. Interaction of ionizing radiation with matter 2. Fundamentals of radiotherapy 3. Target definition in treatment planning 4. Beam DefinitionVirtual Simulation 5. Photon-Beam Treatment Planning Techniques 6. Electron-Beam Treatment Planning Techniques 7. Dose Evaluation of Treatment Plans 8.Biological Evaluation of Treatment Plans 9. Quality Assurance of the Treatment Planning Process 10. Quality Control of Treatment Delivery
Prerequisites and co-requisites	Nuclear medicine and radiotherapy - fundamentals

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
written exams/test	50.0%	50.0%
written report	50.0%	50.0%

Recommended reading

Basic literature	Handbook of radiotherapy Physics, ed. P. Mayles, wyd Taylor&Francis
Supplementary literature	Praca zbiorowa pod redakcją A. Z. Hrynkiewicza i E. Rokity "Fizyczne metody diagnostyki medycznej i terapii" G. J. Kutcher, C. Burman "Calculation of complication probability factors for non-uniform normal tissue irradiation; the effective volume method" Int. J. Radiat. Oncol. Biol. Phys., 16, 1623-1630, 1989
eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed	1. Probability of healing 2. Probability of damage of normal tissue
Work placement	Not applicable

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