



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	February 2025		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	3		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_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		
	[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		

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 report	50.0%	50.0%
	written exams/test	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. Hryniewiczza 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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