

Subject card

Subject name and code	Medical Chemistry (Lecture), PG_00182367						
Field of study	Medical Physics						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2025/2026		
Education level	Bachelor's studies		Subject group		Obligatory subject group in the field of study		
Mode of study	full-time studies		Mode of delivery		at the university		
Year of study	1		Language of instruction		Polish		
Semester of study	1		ECTS credits		2.0		
Learning profile	academic		Assessment form		credit		
Conducting unit	Faculty of Mathematics, Physics and Informatics -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		mgr inż. Sylwia Grabowska				
	Teachers		mgr inż. Sylwia Grabowska				
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	0.0	0.0	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		0.0		30.0	60
Subject objectives	1. Gaining fundamental knowledge of branches of chemistry that have applications in medical physics. 2. Understanding in particular physical chemistry, radiation chemistry, radiochemistry, and radiopharmacy. 3. Ability to behave appropriately in a radiopharmaceutical laboratory and the skill of decontamination.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[FIZMEDL3_W11] Knows at an advanced level the concepts of radiobiology, dosimetry, and radiological protection.		The student: Identifies issues from chemistry, physical chemistry, radiochemistry, radiopharmacy, and biochemistry that are used in the medical physicist profession. Explains and describes topics in the field of medical physics, including: radiation chemistry, nuclear chemistry, physical chemistry, radiochemistry, radiopharmacy, and elements of biochemistry and biotechnology.		[SW3] text preparation/written work		
	[FIZMEDL3_W02] Knows and understands to an advanced level selected biological phenomena and processes, as well as the laws of physics and chemistry underlying them.		The student defines and describes basic physical theories related to nuclear physics and can apply them to describe chemical and biochemical processes.		[SW3] text preparation/written work		

Subject contents

1. Chemical elements
2. Basic chemical concepts and laws
3. Elements of inorganic compounds systematic
4. Structure and chemical bonds
5. Elements of biochemistry
6. Amino acids structure and properties
7. Structure of polypeptides and proteins
8. Carbohydrates, lipids, nucleic acids
9. Main pathways of biosynthesis and catabolism of carbohydrates, lipids, and proteins
10. Biochemistry of the most important human systems and organs: brain, muscular system, digestive system, urinary system
11. Physical chemistry
12. Chemical thermodynamics: entropy, enthalpy, free energy
13. Chemical kinetics
14. Electrochemistry
15. Photochemistry
16. Radiation chemistry: interactions of ionizing radiation with living organisms
17. Nuclear chemistry: structure and stability of atomic nuclei
18. Chemical reactions and issues related to nuclear energy
19. Elements of radiochemistry and radiopharmacy
20. Radiochemistry: physicochemical properties of compounds containing radioisotopes, applications of radioisotopes in science and technology
21. Nuclear medicine: medical applications of radioisotopes
22. Radioisotopes used in nuclear medicine and their production
23. Radiopharmaceuticals: preparation, chemical structure, pharmacokinetics
24. Diagnostic and therapeutic radiopharmaceuticals
25. Specific aspects of radiopharmaceuticals in positron emission tomography (PET)

	26. Quality control of radiopharmaceuticals, the role of chromatography		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	credit	51.0%	100.0%
Recommended reading	Basic literature	no aplicable	
	Supplementary literature	no aplicable	
	eResources addresses		
Example issues/ example questions/ tasks being completed	no aplicable		
Work placement	Not applicable		

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