University of Gdańsk

Subject card

Subject name and code	Medical Chemistry (Lecture), PG_00205379		
Field of study	Medical Physics		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2026/2027
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		

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	20.0	50

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)

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<tr><td></td><td colspan="3">26. Quality control of radiopharmaceuticals, the role of chromatography</td></tr>
<tr><td>Prerequisites and co-requisites</td><td colspan="3"></td></tr>
<tr><td>Assessment methods and criteria</td><td colspan="3"><table><tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr><tr><td>credit</td><td>51.0%</td><td>100.0%</td></tr></table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td colspan="2">no aplicable</td></tr>
<tr><td>Supplementary literature</td><td colspan="2">no aplicable</td></tr>
<tr><td>eResources addresses</td><td colspan="2"></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="3">no aplicable</td></tr>
<tr><td>Work placement</td><td colspan="3">Not applicable</td></tr>
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