University of Gdańsk

Subject card

Subject name and code	Fundamentals of Clinical Medicine and its diagnostic imaging, PG_00182150						
Field of study	Medical Physics						
Date of commencement of studies	October 2026		Academic year of realisation of subject	2027/2028			
Education level	Bachelor's studies		Subject group	Obligatory subject group in the field of study 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	3.0			
Learning profile	academic		Assessment form	exam			
Conducting unit	Faculty of Mathematics, Physics and Informatics -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		prof. dr hab. n. med. Przemysław Rutkowski				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	15.0	0.0	0.0	0.0	45
	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	45	0.0	45.0	90

Subject objectives	1. Knowledge of the mechanisms of disease development, symptomatology, and progression. 2. Understanding the role of radiological examinations and radiotherapeutic procedures in the diagnosis of diseases. 3. Ability to consciously plan and modify radiological and radiotherapeutic procedures.

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[FIZMEDL3_W09] Knows at an advanced level the construction and operating principles of measurement instruments, electronic systems, and diagnostic and therapeutic equipment used in physics research and in medical diagnosis and therapy.	The student knows and understands the mechanisms behind the development of major diseases and their primary symptoms. The student understands the basis for selecting specific radiological methods for different groups of pathologies.	[SW4] test/exam - oral or written
	[FIZMEDL3_U06] Can present in an accessible way the latest achievements in the field of medical physics, the principles of operation of diagnostic and therapeutic equipment and the principles of radiation protection.	He is able to present complex topics in medical physics clearly and accessibly, tailoring his communication style to the audience (e.g., patients, physicians, or non-medical individuals). He can describe the operating principles of sophisticated diagnostic (e.g., MRI, PET, CT) and therapeutic (e.g., linear accelerators) equipment, focusing on key physical and technical aspects. He is also able to explain the fundamental principles of radiation protection, including both biological and physical mechanisms, to raise awareness of radiation safety.	[SU2] presentation/project/paper/ report
	[FIZMEDL3_K02] He is ready to constantly update his knowledge in physics and medical physics to solve cognitive and practical problems independently and to use the opinions and assistance of experts.	Demonstrates openness to the opinions of others and can critically evaluate their own knowledge of clinical medicine and diagnostic methods, which allows them to consciously use the assistance and expertise of specialists.	[SK2] presentation/project/paper/ report
	[FIZMEDL3_W08] Knows and understands the mechanisms of general and specific pathology, the pathogenesis of diseases and dysfunctions, the fundamentals of clinical examination, and the role of radiological and radioisotope studies in clinical diagnosis.	Knows and understands the basic mechanisms of general pathology (e.g., inflammation, tumours, degenerations) and specific pathology concerning key systems and organs, such as the circulatory, respiratory, digestive, and nervous systems. Demonstrates advanced knowledge of the role and physical principles of radiological and radioisotope examinations in the diagnosis of diseases of particular systems.	[SW4] test/exam - oral or written
	[FIZMEDL3_W07] Knows and understands at an advanced level the concepts of diagnostic and therapeutic methods and their quality control in medical applications.	Demonstrates advanced knowledge of radiological and radioisotope examinations in the diagnosis of diseases of specific systems, as well as the specific characteristics of diagnostic imaging in paediatrics and obstetrics. Also understands quality control procedures and their significance in ensuring the reliability of diagnostics.	[SW4] test/exam - oral or written
	[FIZMEDL3_K01] He is ready for a critical evaluation of his own knowledge and the information he receives, and understands the need for further education and for improving professional and personal competencies.	The student is prepared to critically evaluate their own knowledge and skills, which is essential during clinical demonstrations with patients suffering from various conditions (e.g., circulatory failure, neurological diseases). The student understands the need for continuous professional development, especially regarding new diagnostic and therapeutic methods presented during the discussion of clinical cases.	[SK2] presentation/project/paper/ report

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<tr><th>Course outcome</th><th>Subject outcome</th><th>Method of verification</th></tr>
<tr><td>[FIZMEDL3_U03] He is able to select and apply appropriate medical equipment to perform selected diagnostic measurements or to carry out basic and specialised tests, and to prepare a report containing a description, analysis, error discussion, and conclusions regarding the results of the studies within the competence of a medical physicist.</td><td>The student can apply knowledge of general pathology in the medical physicist profession, specifically in the preparation of radiological examinations and the preparation of radiotherapy.</td><td>[SU4] test/exam - oral or written</td></tr>
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<tr><td>Subject contents</td><td>Lecture Topics

1. General Pathology: Circulatory disorders, inflammation, degenerations, tumors, dysfunctions.
2. Diseases of the Circulatory System: Circulatory failure, arterial hypertension, myocardial infarction. The role of coronary angiography, echocardiography, and radioisotope examinations. The role of coronary angiography and coronary angioplasty.
3. Diseases of the Respiratory System: Respiratory failure, respiratory tract infections, bronchial asthma, tuberculosis, pulmonary embolism, bronchial carcinoma. The role of radiography in the diagnosis of lung diseases.
4. Diseases of the Digestive System: Peptic ulcer disease of the stomach and duodenum, liver and pancreatic diseases, colon diseases, tumors of the digestive tract.
5. Diseases of the Genitourinary System: Renal failure, urinary tract infections, kidney stones.
6. Major Diseases of the Musculoskeletal System.
7. Fundamentals of Endocrinology: Diabetes.
8. Fundamentals of Neurology: Stroke, dementia, epilepsy.
9. Major neuroradiological examinations.
10. Peculiarities of diagnostic imaging in pediatrics.
11. The role of ultrasonographic diagnostics in obstetrics.
12. Key topics in gynecology.
13. General oncogenesis.
Practical Exercises
Clinical demonstrations of patients with circulatory and respiratory failure, diseases of the digestive, musculoskeletal, and neurological systems, and childhood diseases.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td></td></tr>
<tr><td>Assessment methods and criteria</td><td>
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<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>exam</td><td>51.0%</td><td>80.0%</td></tr>
<tr><td>presentation</td><td>51.0%</td><td>20.0%</td></tr>
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<tr><td>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td>not applicable</td></tr>
<tr><td>Supplementary literature</td><td>not applicable</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
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<tr><td>Example issues/ example questions/ tasks being completed</td><td>not applicable</td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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