



Subject card

Subject name and code	Engineering Problems in Neurology, PG_00064133						
Field of study	Mechanical and Medical Engineering						
Date of commencement of studies	October 2025	Academic year of realisation of subject				2026/2027	
Education level	first-cycle 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	4	ECTS credits				1.0	
Learning profile	general academic profile	Assessment form				assessment	
Conducting unit	Institute of Mechanics and Machine Design -> Faculty of Mechanical Engineering and Ship Technology -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		Grzegorz Kozera				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	10.0	0.0	5.0	0.0	0.0	15
	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	15	1.0	9.0	25		
Subject objectives	To acquaint the student with the basic causes, symptoms and treatments of diseases of the nervous system. Overview of the most important methods of neuroimaging, neurophysiological and ultrasound diagnostics used in neurology. Mastering by the student to solve the basic problems related to the prevention of diseases of the nervous system						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_K02] is aware of importance of professional dealing and to fulfill ethics obligations, he/she understands other (nontechnical) abilities of mechanical engineering professional, their influence on the society and security of environment, he/she is aware of importance of social cooperation	The student is aware of the importance of non-technical conditions and effects of engineering activities. The student is aware of the responsibility for the decisions made.			[SK2] Assessment of progress of work		
	[K6_W01] has knowledge in the field of natural sciences, including mathematics, contemporary physics, chemistry, and human anatomy with physiology	The student is able to recognize the basic symptoms of disease, can select adequate diagnostic techniques and knows the rules of prevention.			[SW1] Assessment of factual knowledge		
	[K6_U08] is able to assess the human body physic and functioning of the body organs and is able to use medical knowledge to solve mechanical-medical problems in the scope of the study	The student describes the basic elements of the nervous system, explains the most important principles of their functioning and the main causes of disease symptoms			[SU3] Assessment of ability to use knowledge gained from the subject		

Subject contents	<p>Course content – lecture</p> <p>1: Basics of the anatomy of the nervous system: - structure of the central and peripheral nervous system, - construction of the motor and sensory system, - the most common disorders in the sensory system.</p> <p>2: Vascular diseases of the brain - stroke / TIA: - epidemiology and risk factors, - main symptoms of the disease, - treatment methods, - diagnostics - neuroimaging techniques, - stroke prevention.</p> <p>3. Diseases of the spine and spinal cord: - anatomy and function of the spine and spinal cord, - the most common diseases of the spine and spinal cord, - diagnostic and therapeutic methods, - prevention of diseases of the spine.</p> <p>4. Methods of diagnosing nervous system diseases: neurophysiological basics, used used, clinical indications and obtained results</p> <p>A: electrophysiological tests:</p> <ul style="list-style-type: none"> <li>- electroencephalography,</li> <li>- nerve conduction studies,</li> <li>electromyographic examination,</li> <li>- evoked potentials;</li> </ul> <p>B: ultrasound examinations:</p> <ul style="list-style-type: none"> <li>-ultrasound of intracerebral arteries,</li> <li>- transcranial ultrasound,</li> <li>- ultrasound of peripheral nerves.</li> </ul>
	<p>Course content – laboratory</p> <p>1: Basics of the anatomy of the nervous system: - structure of the central and peripheral nervous system, - construction of the motor and sensory system, - the most common disorders in the sensory system.</p> <p>2: Vascular diseases of the brain - stroke / TIA: - epidemiology and risk factors, - main symptoms of the disease, - treatment methods, - diagnostics - neuroimaging techniques, - stroke prevention.</p> <p>3. Diseases of the spine and spinal cord: - anatomy and function of the spine and spinal cord, - the most common diseases of the spine and spinal cord, - diagnostic and therapeutic methods, - prevention of diseases of the spine.</p> <p>4. Methods of diagnosing nervous system diseases: neurophysiological basics, used used, clinical indications and obtained results</p> <p>A: electrophysiological tests:</p> <ul style="list-style-type: none"> <li>- electroencephalography,</li> <li>- nerve conduction studies,</li> <li>electromyographic examination,</li> <li>- evoked potentials;</li> </ul>

	<p>B: ultrasound examinations:</p> <ul style="list-style-type: none"> <li>-ultrasound of intracerebral arteries,</li> <li>- transcranial ultrasound,</li> <li>- ultrasound of peripheral nerves.</li> </ul>		
Prerequisites and co-requisites	Basic knowledge of the subjects: Physics, Biology, Electrical Engineering		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Attendance / participation in classes	80.0%	100.0%
Recommended reading	Basic literature	Ryszard Podemski. Kompendium Neurologii. Via Medica Gdańsk 2019, wyd.4	
	Supplementary literature	<p>Okroj-Lubecka Julitta, SZUROWSKA EDYTA, KOZERA GRZEGORZ: Metody neuroobrazowania ostrej fazy udaru niedokrwinnego mózgu w praktyce klinicznej Forum Med. Rodz. 2015 : t. 9, nr 6</p> <p>Radosław Kaźmierski (red.) <i>Podręcznik diagnostyki ultrasonograficznej w neurologii</i>, Czelej, Lublin 2011</p> <p>Grzegorz Kozera, Joanna Wojczal, Walenty Michał Nyka Zastosowanie badań ultrasonograficznych w profilaktyce udaru mózgu. Forum Medycyny Rodzinnej 2008. T 2, nr 6, s</p>	
	eResources addresses		
Example issues/ example questions/ tasks being completed	<p>Discuss the structure of the nervous system. Justify the statement that a stroke is a growing threat of the 21st century, indicate its most common symptoms. Indicate the most important principles of the prevention of vascular diseases of the CNS, explain why "it is better to heal than to prevent". What does the "time is the brain" principle mean. Point out the advantages and disadvantages of individual neuroimaging techniques. Present the principles of work and everyday ergonomics, which are beneficial in reducing the risk of developing spine diseases. Define indications and discuss the methods of ultrasound and electrophysiological examinations used in neurology.</p>		
Practical activities within the subject	Not applicable		

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