DESCRIPTION OF COURSE UNIT FOR DOCTORAL STUDIES AT VILNIUS UNIVERSITY

Scientific Area/eas, Field/ds of Science	Medical and Health Sciences (M000): Medicine (M001)			
Faculty, Institute, Department/Clinic	Faculty of Medicine Institute of Biomedical Sciences Department of Physiology, Biochemistry, Microbiology and Laboratory Medicine			
Course unit title (ECTS credits, hours)	**Neurophysiology** 7 credits (186 hours)			
Study method	**Lectures**	**Seminars**	**Consultations**	**Self-study**
Number of ECTS credits	-	-	1	6
Method of the assessment (in 10 point system)	Presentation and evaluation: the presentation is based on a focused topic, which is coordinated with the coordinating teachers (the PhD student has to analyze, review and present the most recent scientific publications related to the relevant topic). Criteria for the evaluation of the presentation (minimum score of 5): (a) Relevance, novelty and appropriateness of the material presented (2 points); (b) the overall structure and scope of the presentation, clarity of knowledge, reasoning, conciseness and specificity (2 points); (c) summary, presentation and justification of conclusions (1 point); (d) raising problematic issues and demonstrating the application of the knowledge reviewed in the thesis (3 points); (e) organization of visual aids, ability to participate in discussion, question management, oratorical skills (2 points).			

PURPOSE OF THE COURSE UNIT

The main purpose of this course is to provide a deeper foundation of fundamental knowledge for scientific activity and evidence-based medical practice, a more comprehensive and in-depth analysis and systematization of knowledge, skills and attitudes about the functioning of the human peripheral and central nervous systems, the interrelationships between them, and the mechanisms that regulate various bodily functions.

THE MAIN TOPICS OF COURSE UNIT

Membrane physiology: Mechanisms of transport. Excitability and refractory period of neural tissue. Peculiarities of the mechanisms of nerve impulse propagation in myelinated and non-myelinated nerve fibers. Parabiosis, its medical applications. Mechanism of occurrence of synaptic potential. Central and peripheral chemical synapses, their mediators, mechanisms of action of mediators. Ionotropic and metabotropic receptors. Electrical synapses.

Muscle: Mechanisms of contraction and relaxation of the striated muscles. Energetics of the striated muscle. Peculiarities of membrane and action potentials,

contraction and relaxation mechanisms of smooth muscle.

Peripheral nervous system. Structure and function of the sympathetic, parasympathetic and metasympathetic/enteric nervous systems, their mediators and their role in the regulation of visceral function. Autonomic reflexes, their medical significance.

Central nervous system. Functions of neuroglia. Neural centers, their functional characteristics. Inhibitory processes in the CNS.
Functions of the spinal cord, medulla oblongata and pons, midbrain, thalamus and cerebellum. Neuronal properties of the reticular formation. Functions of the nuclei of the basal ganglia. Functions of the limbic system. Mechanisms of emotions and motivations.
Primary cortex and association areas of the cerebral cortex. Cognitive brain functions, memory and thinking. Neurophysiology of language. Physiology of sleep.
Functions of the visual, auditory, vestibular, olfactory, gustatory, tactile, temperature and pain analyzers.

RECOMMENDED LITERATURE SOURCES

1. Fundamental Neuroscience, Fourth Edition, Elsevier, https://www.clinicalkey.com/#!/browse/book/3-s2.0-C20100650358
2. Data Base: https://www.clinicalkey.com/#!/
3. Kim E. Barrett, Susan M. Barman, Scott Boitano, Heddwen L. Brooks. Ganong's Revi Medical Physiology, http://accessmedicine.mhmedical.com/content.aspx?sectionid=97163015&bookid=1587&R click=2
4. Jonathan D. Kibble, PhD, Colby R. Halsey, MD. Medical Physiology: The Big Pi http://accessmedicine.mhmedical.com/content.aspx?bookid=1291&sectionid=75575843
5. John E. Hall. Guyton and Hall Textbook of Medical Physiology, 13th Edition. Elsevier, 2022
6. Data Base: http://accessmedicine.mhmedical.com/

CONSULTING LECTURERS

1. Coordinating lecturer: Vaiva Hendrixson (Prof. Dr.).
2. Valerija Jablonskienė (Assoc. Prof. Dr.).
3. Dalia Paškevičienė (Dr.).
4. Jonas Algis Abaravičius (Prof. Dr. HP).

APPROVED

By Council of Doctoral School of Medicine and Health Sciences at Vilnius University: 29th of September 2022

Chairperson of the Board: Prof. Janina Tutkuvienė