

**DESCRIPTION OF COURSE UNIT FOR DOCTORAL STUDIES  
AT VILNIUS UNIVERSITY**

<b>Scientific Area/eas, Field/ds of Science</b>	Medical and Health Sciences (M 000): Medicine (M 001)			
<b>Faculty, Institute, Department/Clinic</b>	Faculty of Medicine Institute of Clinical Medicine Clinic of Anesthesiology and Intensive Care			
<b>Course unit title</b> (ECTS credits, hours)	<b>Regional Anesthesia</b> 5 credits (135 hours)			
<b>Study method</b>	<b>Lectures</b>	<b>Seminars</b>	<b>Consultations</b>	<b>Self-study</b>
Number of ECTS credits	-	-	1	4
<b>Method of the assessment</b> (in 10 point system)	Written and oral exam. Two questions from the block of questions are answered in written form, followed by an oral discussion. The assessment is as follows: 10 (Excellent): Excellent performance, outstanding knowledge and skills. 9 (Very good): Strong performance, good knowledge and skills. 8 (Good): Above the average performance, knowledge and skills. 7 (Highly satisfactory): Average performance, knowledge and skills with unessential shortcomings. 6 (Satisfactory): Below average performance, knowledge and skills with substantial shortcomings. 5 (Sufficient): Knowledge and skills meet minimum criteria.			
<b>PURPOSE OF THE COURSE UNIT</b>				
To provide theoretical and practical knowledge based on the latest research on the etiology of pain, pathophysiology, effects on the human body, principles, methods, mechanism and effects of anesthesia, perioperative features of regional anesthesia.				
<b>THE MAIN TOPICS OF COURSE UNIT</b>				
<p><u>Introduction.</u> History of the development of regional anesthesia and pain treatment. Physiology of the nervous system. Neuron, axon, and peripheral nerves. Nerve membranes and impulse propagation. Physiology and pharmacology of pain, its effects on various body systems. Influence of regional anesthesia on operational stress.</p> <p><u>Local anesthetics.</u> Structure and mechanism of action. Properties of local anesthetics: potency (lipid solubility), onset of action (protein binding, solution pH), duration of action (pKa). Absorption, distribution and metabolism of local anesthetics. Action of local anesthetics at the molecular level. Toxicity of local anesthetics: local tissue toxicity, transient neurological symptoms. Systemic intoxication due to intravascular injection or particularly rapid absorption of a local anesthetic.</p> <p><u>CNS and cardiovascular intoxication:</u> diagnosis, prevention and treatment. Representatives of local anesthetics, drug combinations and additives. Clinical pharmacology of local anesthetics. Pharmacological and other factors affecting the activity of local anesthetics.</p> <p><u>Preoperative assessment of the patient.</u> Indications and contraindications for regional anesthesia. Anticoagulant use and regional anesthesia. Monitoring of a patient undergoing regional anesthesia. Peculiarities of the perioperative period in patients undergoing regional anesthesia. Use of regional anesthesia during various surgeries (adults and children). Regional blockades and outpatient surgery.</p>				

Central nerve blockade. Spinal and epidural block. Anatomy and physiology of the spine, spinal cord and nerves.

Spinal anesthesia. Effects on the body: cardiovascular, respiratory, hepatic, renal, visceral, neuroendocrine and thermoregulatory systems. Pharmacology of spinal blockade. Segmental nature of blockade. Technique of spinal anesthesia (means, patient position, procedure, monitoring). Complications of spinal anesthesia.

Epidural anesthesia. Effects on body systems. Factors determining the level, onset, and duration of epidural blockade. Thoracic epidural block in patients with ischemic heart disease. Pharmacology of epidural blockade. Technique of performing epidural anesthesia. Maintenance and disposal of epidural catheters. Complications of epidural anesthesia and their treatment (blood patch). Differences between spinal and epidural anesthesia. Combined spinal-epidural anesthesia. Caudal epidural blockade - pharmacology, effects on body systems, technique and complications.

Blockade of peripheral nerves. Methods of nerve detection (neurostimulation, sonoscopy). Head and neck nerve blockages - anatomy, technique, complications. Nerve blockade of the upper extremities, patient care, medications and remedies. Anatomy of the shoulder plexus. Intercostal shoulder plexus blockade, maxillofacial and postoperative shoulder plexus blockade, axillary shoulder plexus blockage - performance technique, peculiarities, complications. Blockade of nerves (middle, spinal, elbow) of other upper extremities by various approaches. Lower limb nerve block, patient care, medications and remedies. Lumbar plexus block, possible complications. Sciatic nerve blockade - anatomy, performance technique, complications. Thigh nerve block - anatomy, technique, complications. Lateral thigh skin nerve block - anatomy, technique, complications. Barrier nerve block - anatomy, performance technique, complications. Knee and ankle blockade - anatomy, technique, complications. Intranasal analgesia. Venous regional anesthesia, advantages and disadvantages. Venous regional anesthesia technique, drugs, complications. Paravertebral, intercostal block and pleural analgesia. Advantages of regional anesthesia over general anesthesia. Long-term anesthesia of neural plexuses using neural plexuses care and complications. Patient-controlled analgesia method.

Concepts of acute and chronic pain management. Anatomy and physiology of the sympathetic nervous system. Evaluation of the effectiveness of sympathetic blockade. Blockade of sympathetic nerves in the upper and lower extremities. Ganglion stellatum blockade - performance technique, indications, complications. Thoracic sympathetic blockade - technique, indications, complications. Luminescent sympathetic blockade - performance technique, indications, complications. Chest and abdominal nerve block, patient care, medications and remedies. Plexus celiacus blockade - anatomy, technique, complications. Plexus hypogastricus blockade - anatomy, technique, complications.

### **RECOMMENDED LITERATURE SOURCES**

1. Joel A. Kaplan, Kaplan's Cardiac Anesthesia for Cardiac and Noncardiac Surgery. 7th edition, 2016:  
<https://www.elsevier.com/books/kaplans-cardiac-anesthesia/kaplan/978-0-323-39378-2>
2. Hugh C. Hemmings, Talmage D. Egan. Pharmacology and Physiology for Anesthesia. Foundations and clinic application. 2nd edition, 2018:  
<https://www.elsevier.com/books/pharmacology-and-physiology-for-anesthesia/hemmings/978-0-323-48110-6>
3. Roberta L. Hines, Stephanie B. Jones. Stoelting's Anesthesia and Co-Existing Disease. 8th edition, 2021:  
<https://www.elsevier.com/books/stoelting's-anesthesia-and-co-existing-disease/hines/978-0-323-71860-8>

4. Andrew T. Gray. Atlas of Ultrasound-Guided Regional Anesthesia. 3rd edition, 2018:  
<https://www.elsevier.com/books/atlas-of-ultrasound-guided-regional-anesthesia/9780323509510>
5. James E. Cottrell, Piyush Patel. Cottrell and Patel's Neuroanesthesia. 6th edition, 2016:  
<https://www.elsevier.com/books/cottrell-and-patel-s-neuroanesthesia/978-0-323-35944-3>
6. Jan Ehrenwerth, James B. Eisenkraft, James M. Berry. Anesthesia Equipment: Principles and Applications. 3rd edition, 2020:  
<https://www.elsevier.com/books/anesthesia-equipment/978-0-323-67279-5>
7. Brian M. Keech, Ryan D. Laterza. Anesthesia Secrets. 6th edition, 2020:  
<https://www.elsevier.com/books/anesthesia-secrets/keech/978-0-323-64015-2>
8. Lee A. Fleisher, Stanley H. Rosenbaum. Complications in Anesthesia. 3rd edition, 2017:  
<https://www.elsevier.com/books/complications-in-anesthesia/978-1-4557-0411-8>
9. Michael A. Gropper, Lars I. Eriksson, Lee A. Fleisher, Kate Leslie, Jeanine P. Wiener-Kronish, Neal H. Cohen. Miller's Anesthesia. 9th edition, 2019:  
<https://www.elsevier.com/books/millers-anesthesia-2-volume-set/gropper/978-0-323-59604-6>
10. Stephan B. McMahon, Martin Koltzenburg, Irene Tracey, Dennis C. Turk. Wall and Melzack's Textbook of Pain. 6th edition, 2013:  
<https://www.vitalsource.com/products/wall-amp-melzack-39-s-textbook-of-pain-e-book-stephen-b-mcmahon-martin-v9780702053740>
11. Peter J. Davis, Franklyn P. Cladis. Smith's. Anesthesia for Infants and Children. 10th edition, 2021:  
<https://www.elsevier.com/books/smith-s-anesthesia-for-infants-and-children/davis/978-0-323-69825-2>
12. Carin A. Hagberg, Carlos A. Artime, Michael F. Aziz. Hagberg and Benumof's Airway Management. 4th edition, 2017:  
<https://www.elsevier.com/books/hagberg-and-benumofs-airway-management/unknown/978-0-323-44918-2>

#### **CONSULTING LECTURERS**

1. Coordinating lecturer: Jūratė Šipylaitė (Prof. Dr. HP).
2. Eglė Kontrimavičiūtė (Assoc. Prof. Dr.).
3. Saulė Švedienė (Assoc. Prof. Dr.).
4. Diana Gasiūnaitė (Lect. Dr.).

#### **APPROVED:**

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

Chairperson of the Board: Prof. Janina Tutkuvienė