

**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>Clinical Anesthesiology</b> 10 credits (270 hours)			
<b>Study method</b>	<b>Lectures</b>	<b>Seminars</b>	<b>Consultations</b>	<b>Self-study</b>
Number of ECTS credits	-	-	1	9
<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, pathophysiology of pain, effects of pain on the human organism, principles, methods, mechanism and effects of anesthesia.				
<b>THE MAIN TOPICS OF COURSE UNIT</b>				
<p><u>Introduction.</u> History and future perspectives of anaesthesiology. Cellular and molecular mechanisms of anesthesia. Effects of anesthesia on the central nervous system. Effects of anesthetics on electrophysiology of the nervous system. Effects of anesthetics on ion channel function. Lipid, protein and other anesthesia theories.</p> <p><u>Acid base balance of the human organism.</u> Metabolic alkalosis, physiological effects, diagnostics. Metabolic acidosis, physiological effects, diagnosis. Respiratory alkalosis, physiological effects, diagnostics. Respiratory acidosis, physiological effects, diagnosis.</p> <p><u>Infusion therapy in anesthesiology practice.</u> Physiology, regulation of extravascular volume. Fluid balance during operation, evaluation and monitoring of fluid balance. Fluid replacement therapy – colloids, crystalloids and hypertonic solutions. Electrolytes (sodium, potassium, calcium, magnesium, phosphorus) regulation and treatment in anaesthesiology.</p> <p><u>Hemostasis and transfusion therapy.</u> Oxygen transport, physiology and monitoring. Indications, methods, complications of transfusion of blood and its components. Hemostasis - the mechanism of blood clotting, control. Fibrinolysis. Assessment and treatment of blood coagulation.</p> <p><u>Preoperative evaluation of patients.</u> Evaluation of patients with cardiovascular disease before anesthesia. Peculiarities of evaluation of patients with respiratory diseases. Assessment of respiratory system before anesthesia.</p> <p><u>Assessment of airway before anesthesia.</u> Management of airway, difficult airway guidelines.</p>				

Anesthesia during neurosurgical operations. Physiology and pathophysiology of the nervous system, its significance in anesthesiological practice. Effects of anesthetics and other drugs on brain physiology. Brain protection and tools used during anesthesia. Monitoring brain activity during anesthesia. Evaluation and preparation of anesthesia for neurosurgical patients. Anesthetic drugs used in various neurosurgical surgeries. Influence of patient position during surgery (sitting position) on anesthesia. Use of controlled hypotension in neuroanesthesiology. Peculiarities of anesthesia in a patient with head trauma.

Anesthesia in cardiothoracic surgery. Preoperative evaluation of patients, preparation for anesthesia and surgery. Intraoperative monitoring of lung ventilation and blood oxygenation in thoracic surgery. One-lung ventilation, indications, methods of lung separation (bronchial blockers, double-lumen endobronchial tubes etc.). One-lung ventilation methodology. Principles of anaesthesia method selection in thoracic surgery. Postoperative care of thoracic patients. Complications after thoracic surgery.

Anesthesia in cardiac surgery. Anesthesia for coronary artery disease surgical treatment – hemodynamics correction, ischemia monitoring, choice of anesthetics, ischemia treatment. Anesthesia for valvular heart disease, surgical treatment. Aortic insufficiency, aortic stenosis, mitral regurgitation, mitral stenosis, hypertrophic cardiomyopathy, pathophysiology and treatment. Cardiopulmonary bypass, equipment, oxygenators, methods. Myocardial protection in cardiac surgery. Extracorporeal membrane oxygenation. Postoperative care of cardiac patients. Anesthesia for children with congenital heart disease, preoperative evaluation, anesthesia method selection, postoperative care.

Anesthesia in reconstructive vascular surgery. Preoperative evaluation, preparation. Carotid endarterectomy, preoperative evaluation. Monitoring and preserving neurologic integrity during carotid endarterectomy. Anesthesia method selection and postoperative care. Aortic reconstruction surgery, pathophysiology of aortic occlusion and reperfusion. CNS and spinal cord ischemia and protection in aortic reconstruction surgery. Anesthesia in emergency aortic reconstruction surgery.

Anesthesia in different types of surgery, egz. laparoscopic surgery. Human physiology shifts during laparoscopic surgery. Anesthesia in orthopedics. Anesthesia method selection in orthopedic surgery. Obstetric anesthesia. Physiologic changes of pregnancy. Fetal exposure to anesthetic drugs. Anesthesia for labor and vaginal delivery. Anesthesia for Cesarean section, principles of anesthesia method selection. Anesthesia management for high risk parturients (preeclampsia, eclampsia, antepartum hemorrhage). Anesthesia during organ transplantation.

Anesthesia in different age groups: newborns, babies and children. Anatomy and physiology in newborns, babies and children, effect on anesthesia. Anesthesia for geriatric patient. Concept of aging and geriatrics, aging and organ function (cardiopulmonary, respiratory, hepatorenal, central, peripheral and autonomic nervous system). Analgesic and anesthetic requirements in geriatrics.

## **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 (Lekt. 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