



**CD 8.5.1 DISCIPLINE SYLLABUS FOR
UNIVERSITY STUDIES**

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FACULTY OF MEDICINE No.2

STUDY PROGRAM 0912.1: MEDICINE

**CHAIR OF ANESTHESIOLOGY AND REANIMATOLOGY No. 1
NAMED AFTER VALERIU GHEREG**

APPROVED

at the meeting of the Commission for Quality
Assurance and Evaluation of the Curriculum

in Medicine

Minutes No. 1 of 28.08.23

Chairman, professor,
Dr.habil.of med.

Suman Serghei 

APPROVED

at the Council meeting of the Faculty of
Medicine No 2

Minutes No. 1 of 26.09.23

Dean of Faculty, Associated professor,
Dr.of med.

Bețiu Mircea 

APPROVED

at the meeting of the chair of Anesthesiology and
reanimatology No.1 named after Valeriu Ghereg

Minutes No. 1 of 25.08.2023

Head of chair, professor, Dr.habil.of med.

Șandru Serghei 

SYLLABUS

DISCIPLINE ANESTHESIOLOGY AND REANIMATOLOGY. TOXICOLOGY.

Type of course: **Compulsory**

Curriculum developed by the team of authors:

Șandru Serghei, dr. habil. of med., professor
Tăzlăvan Tatiana, dr. of med, associate professor
Belîi Adrian, dr. habil. of med., professor
Plămădeală Svetlana, dr. of med, associate professor
Baltaga Ruslan, dr. of med, associate professor
Boleac Diana, dr. of med, associate professor
Iapăscuță Victor, university assistant
Ambrosii Tatiana, dr. of med, university assistant
Belîi Natalia, dr. of med, university assistant

Chisinau, 2023



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I. INTRODUCTION

- **General presentation of the discipline: place and role of the discipline in the formation of the specific competences of the professional / specialty training program**

Anesthesiology and reanimatology is a medical speciality concerned with care of patients before, during and after surgery as well as with the diagnosis and management of life-threatening conditions (acute respiratory failure, acute heart failure, kidney injury, liver failure, shock, acute consciousness disorders, hydroelectrolytic and acid-base disturbances).

Toxicology is a field of medicine that studies toxic substances, the potential danger of their impact on organisms, mechanisms of toxic action, as well as methods of diagnosis, prevention and treatment of diseases developing as a result of such exposure.

- **Mission of the curriculum in professional training**
The aim of studying the discipline "Anesthesiology and reanimatology. Toxicology" is to acquire knowledge and some practical skills necessary to carry out general and locoregional anesthesia as well as managing critically ill patients and patients with acute poisonings.
- **Languages of the course:** Romanian, Russian, English, French.
- **Beneficiaries:** students of the V year, faculty Medicine No.2.

II. MANAGEMENT OF THE DISCIPLINE

Code of discipline		S.10.O.088	
Name of the discipline		Anesthesiology and reanimatology. Toxicology.	
Persons in charge of the discipline		Șandru Serghei , Professor, dr.habil.of med. Tăzlăvan Tatiana , Associated professor, dr.of med.	
Year	V	Semester	X
Total number of hours, including:			120
Lectures	24	Practical hours	24
Seminars	24	Self-training	48
Form of assessment	E	Number of credits	4

NB. There are 24 hours of seminars and 24 hours of practical work of which 4 hours for each group are to be used for simulation training at University Center of Simulation in Medical Training.

III. TRAINING AIMS WITHIN THE DISCIPLINE

At the end of the discipline study the student will be able to:

- **at the level of knowledge and understanding:**
 - to know the definition and principles of care of critically ill patients;
 - to know the organizational structure of Anesthesia and Intensive Care Units;



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- to know the components of general anesthesia;
- to know simple anesthetic techniques (general and locoregional anesthesia);
- to know the role of genome in response to drugs used in anesthesia and intensive care medicine;
- to have a basic understanding of anesthetics agents and anesthesia equipment;
- to know the etiology, pathophysiology, classification, clinical signs and symptoms, treatment of acute respiratory failure;
- to know the etiology, pathophysiology, classification, clinical signs and symptoms, treatment of acute heart failure;
- to understand different types of shock (hypovolemic, cardiogenic, distributive, obstructive);
- to know types of fluids and blood components;
- to know general principles of nutrition support in ICU patients;
- to know the most common causes of consciousness disorders and mechanisms regulating intracranial pressure, determinants of cerebral blood flow, management of the comatose patient, criteria for diagnosis of brain death;
- to know acid-base and water-electrolyte disturbances and their clinical significance;
- to know the etiology, clinical manifestations and intensive care of patients with acute liver failure;
- to know the mechanisms of acute kidney injury and intensive care of patients with acute kidney injury;
- to know the principles of pain assessment and principles of analgesic use in the treatment of acute pain.
- to know general principles of intensive care of patients with acute poisoning;
- to know general principles of intensive care unit management of poisonings with alcohol, opioids, psychotropic drugs, carbon monoxide, cyanide, organophosphates, paracetamol, salicylate, poisonius mushrooms.

- ***at the application level:***

- to be able to identify patients with acute respiratory and heart failure, shock and coma patients, as well as patients with acute liver failure and acute kidney injury;
- to be able to manage airway obstruction;
- to be able to ventilate the patient with self-inflating balloon;
- to be able to perform oxygen therapy;
- to be able to interpret monitored parameters in critically ill patients;
- to be able to interpret acid-base and hydroelectrolytic disturbances;
- to be able to assess pain syndrome using specific basic tools and questionnaires tailored to special patient groups (communicable adult / elderly, noncommunicable adult / elderly, child);
- to be able to manage common poisonings in ICU.

- ***at the integration level:***

- to be able to make connections with basic medical sciences;
- to be able to make connections between anesthesiology and intensive care, toxicology and other clinical disciplines;
- to keep professional development continuous.



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IV. PROVISIONAL TERMS AND CONDITIONS

Anesthesiology and reanimatology as well as toxicology are interdisciplinary specialities. In order to learn this discipline, a good knowledge of human physiology and pathophysiology, pharmacology, surgery, internal medicine, emergency medicine is essential. Professors during lectures and practical classes make connections with such basic medical sciences as anatomy, human physiology and pathophysiology, biochemistry (discussing structural and functional changes at molecular, cellular, and organ systems level), clinical pharmacology (drugs, mechanisms of action) - horizontal integrations as well as vertical - surgery, internal medicine, emergency medicine, imaging (identification of diseases that can lead to the development of critical states, diagnosis methods, general principles of management).



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V. THEMES AND ESTIMATE ALLOCATION OF HOURS

No. d/o	THEME	Number of hours			
		Lectures	Seminars	Practical hours	Self- training
1.	The organization of Anesthesia and Intensive Care units. Management principles of the critically ill patient.	0	2	2	2
2.	General anesthetics.	2	2	2	4
3.	Locoregional anesthetics.	2	2	2	4
4.	Acute pain management.	2	2	2	4
5.	Acute respiratory failure. High fidelity simulation at the University Center of Simulation in Medical Training (clinical scenario "Anaphylaxis") .	2	2	2	4
6.	Monitoring of cardiovascular function. Acute heart failure. High fidelity simulation at the University Center of Simulation in Medical Training (clinical scenarios "Cardiogenic shock in acute coronary syndrome" and "Acute heart failure in hypertensive crisis") .	2	2	2	4
7.	Transfusion (Transfusion Guidelines and protocols) and fluid therapy. Nutrition support in the critically ill patients.	2	0	0	2
8.	Shock. High fidelity simulation at the University Center of Simulation in Medical Training (clinical scenario "Sepsis and septic shock") .	2	2	2	4
9.	Hydroelectrolytic disturbances.	1	1	1	2
10.	Acid-base disturbances.	1	1	1	2
11.	Acute consciousness disorders. Brain death. High fidelity simulation at the University Center of Simulation in Medical Training (clinical scenario "Severe traumatic brain injury") .	2	2	2	4
12.	Acute liver failure.	1	1	1	2
13.	Acute kidney injury	1	1	1	2
14.	Acute exogenous poisonings. General principles of diagnosis and treatment. Principles of intensive care in intoxications with alcohol, opioids, psychotropic drugs.	2	2	2	4
15.	Acute exogenous intoxications. Principles of intensive care in carbon monoxide, cyanide, organophosphates, paracetamol, salicylate, mushroom poisonings.	2	2	2	4
	Total	24	24	24	48

NB. There are 24 hours of seminars and 24 hours of practical work of which 4 hours for each group are to be used for simulation training at University Center of Simulation in Medical Training.



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VI. PRACTICAL TOOLS PURCHASED AT THE END OF THE COURSE

Mandatory essential practical tools are:

- Preoperative evaluation of the patient.
- Anaesthetic risk assesment.
- Preoperative management of patient.
- Safe patient positioning.
- Administration of oxygen through nasal cannula.
- Administration of oxygen through simple mask.
- Administration of oxygen through Venturi mask.
- Administration of oxygen through nonrebreather mask.
- Triple airway manoeuvre by Safar.
- Heimlich maneuver.
- Insertion of oropharingeal and nasopharingeal airways.
- Bag-Valve-Mask Ventilation.
- Nasopharyngeal and oropharyngeal suctioning.
- Monitoring of oxygen saturation of haemoglobin in arterial blood (pulse oximetry).
- Electrocardiographic monitoring.
- Noninvasive blood pressure monitoring.
- Defibrillation.
- Determination of a patient's level of consciousness (Glasgow Coma Scale).
- Diagnosis of brain death.

VII. REFERENCE OBJECTIVES OF CONTENT UNITS

Objectives	Content units
Theme 1. The organizational structure of Anesthesia and Intensive Care Units. Management principles of the critically ill patient.	
<ul style="list-style-type: none">• to know the definition of critically ill patients;• to know criteria for ICU admission;• to know the role and responsibilities of anesthesiologists and intensive/critical care doctors.	Definition of critically ill patients. Management principles of the critically ill patient. The organizational structure of Anesthesia and Intensive Care Units.
Theme 2. General anesthesia.	
<ul style="list-style-type: none">• to know the definition of anesthesia;• to know the basic components of general anesthesia and drugs used for general anesthesia;• to be able to perform orotracheal intubation on the manikin;• to know ASA Physical Status Classification System and Mallampati score;• to be able to select an anesthesia method and to carry out pre-anesthetic assessment.• to know major complications of general anesthesia.	Basic components of general anesthesia. Inhalational and intravenous anesthetics. Muscle relaxants: types, mechanism of action. Opioid analgesics. Pre-anesthetic assessment and premedication. Preoperative assessment and medication. ASA Physical Status Classification System. Phases of general anesthesia. Monitoring during anesthesia. Complications of general anesthesia.



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Objectives	Content units
Theme 3. Locoregional anesthesia.	
<ul style="list-style-type: none"> to know the anatomical aspects of epidural and spinal anesthesia; to know local and regional anesthesia techniques; to know local anesthetics, classification, mechanism of action and side effects; to know major complications of locoregional anesthesia. 	Local anesthetics: mechanism of action. Differential nerve block. Classification and comparison of local anesthetics. Loco-regional anesthesia techniques. Spinal anesthesia. Epidural anesthesia. Complications of locoregional anesthesia.
Theme 4. Acute pain management.	
<ul style="list-style-type: none"> to be aware that "pain is the fifth vital sign", "Access to pain management is a fundamental human right"; to know the problem of pain. to know the national and international pain organizations; to know the terms "nociception", "pain", „nociceptive pain“, „neuropathic pain“ and semiology of the pain syndrome; to be able to diagnose acute and chronic pain syndromes; to be able to use pain assessment tools; to know general principles of pain management; to know the general principles of acute pain management; to know the myths about pain and pain management. 	IASP pain terminology (nociception, pain, nociceptive pain, neuropathic pain, somatic pain, visceral pain, cancer pain, hyperalgesia, allodynia, hyperpathia). General principles of management of acute and chronic pain. The physiology of nociception. Modulation of pain, adaptive and maladaptive neuroplasticity. Theories of pain (intensive theory, specificity theory, gate control theory, neuromatrix theory). Tools and questionnaires for acute pain assessment in special patient groups (children, communicable adult/elderly, noncommunicable adult/elderly). Principles of acute pain management. The biopsychosocial approach to pain. Pharmacological and non-pharmacological interventions for pain management. Analgesic drugs combinations in the treatment of pain. Multidisciplinary treatment of pain.
Theme 5. Acute respiratory failure. High fidelity simulation at the University Center of Simulation in Medical Training (clinical scenario „Anaphylaxis“.	
<ul style="list-style-type: none"> to know the definition of hypoxemic and hypercapnic respiratory failure; to know the pathophysiology of acute respiratory failure; to know arterial O₂ content equation; to know the management of patients with acute respiratory failure; to know the management of airway obstruction; to know diagnostic criteria of acute respiratory distress syndrome; to know therapeutic principles of acute respiratory distress syndrome; to know lung ventilation strategies for acute respiratory distress syndrome; to know the methods of oxygen administration and complications of oxygen therapy; to know the basic principles of mechanical ventilation; 	Acute respiratory failure. Definition and classification. Hypoxemic and hypercapnic respiratory failure. Causes. Mechanisms of hypoxemia and hypercapnia. Symptoms. Management of airway obstructions. Acute respiratory distress syndrome. Etiology. Symptoms. Diagnosis. Treatment. Severe exacerbation of bronchial asthma. Symptoms. Treatment. Oxygen therapy. Indications. Complications. Mechanical ventilation. Indications. Complications. Respiratory monitoring in the ICU.



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Objectives	Content units
<ul style="list-style-type: none"> to know respiratory monitoring in the ICU. 	
Theme 6. Cardiovascular monitoring. Acute heart failure. High fidelity simulation at the University Center of Simulation in Medical Training (clinical scenarios "Cardiogenic shock in acute coronary syndrome" and „Acute heart failure in hypertensive crisis”).	
<ul style="list-style-type: none"> to know the components of cardiac output, determinants of tissue perfusion and factors affecting oxygen transport; to know the components of cardiac output (preload, afterload, contractility, heart rate); to know differentiation between cardiogenic and noncardiogenic pulmonary edema; to know the symptoms of acute left-sided heart failure (pulmonary edema) and to understand the acute heart failure is a medical emergency; to know central hemodynamic parameters and interpretation of changes; to know the symptoms and management of acute heart failure. 	<p>The definition of acute heart failure. Causes of right-sided, left-sided, global ventricular failure and diastolic failure.</p> <p>Components of oxygen transport. Components of cardiac output.</p> <p>Definition of preload and afterload. Factors affecting preload and afterload.</p> <p>Cardiogenic pulmonary edema: causes, symptoms, treatment.</p> <p>Cardiovascular monitoring in anesthesia and ICU.</p> <p>Intra-aortic balloon pump counterpulsation.</p> <p>Cardiac output measurement techniques.</p> <p>Treatment of life-threatening arrhythmias.</p> <p>Vasoactive and inotropic agents used in the treatment of acute heart failure (epinephrine, norepinephrine, phenylephrine, dobutamine, dopamine, ephedrine).</p>
Theme 7. Transfusion (Transfusion Guidelines and protocols) and fluid therapy. Nutrition support in the critically ill patients.	
<ul style="list-style-type: none"> to know blood components and indications for their use; to know types of intravenous fluids and indication for intravenous fluid therapy; to know the indications for parenteral nutrition and components of parenteral nutrition; to be able to write a total parenteral nutrition order. 	<p>Indications for perioperative transfusion.</p> <p>Red cell concentrate. Fresh frozen plasma. Cryoprecipitate. The platelet concentrate.</p> <p>Infusion therapy. Electrolyte and colloidal solutions.</p> <p>Indications for parenteral nutrition. Components.</p>
Theme 8. Shock. Transfusion and fluid therapy. Nutrition support in the critically ill patients. High fidelity simulation at the University Center of Simulation in Medical Training (clinical scenario "Sepsis and septic shock”).	
<ul style="list-style-type: none"> to know the definition of shock; to know the classification of shock; to know the etiology, pathophysiology, clinical signs and symptoms, diagnostic tests and treatment of shock; to be able to integrate theory with practice during treatment of shock. 	<p>Shock. Definition. Classification. Pathophysiology.</p> <p>The hypovolemic shock. Etiology, pathogenesis. Clinical manifestations. Treatment.</p> <p>Cardiogenic shock. Etiopathogenesis. Clinical manifestations. Treatment.</p> <p>Septic shock. Etiopathogenesis. Clinical manifestations. Treatment.</p> <p>Anaphylactic shock. Etiopathogenesis. Clinical manifestations. Treatment.</p> <p>Neurogenic shock. Etiopathogenesis. Clinical manifestations. Treatment.</p> <p>Pulmonary artery embolism. Etiopathogenesis. Clinical manifestations. Treatment.</p>



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Objectives	Content units
Theme 9. Hydroelectrolytic disturbances.	
<ul style="list-style-type: none"> to know the principles of water exchange between fluid compartments (Starling equation); to know the role of glycocalix in regulation of endothelial vascular tissue; latent hypovolemia: modern concepts and detection (tilt-table test, signs and symptoms of dehydration, volume loading test); to be able to diagnose type of fluid disorder (dehydration, hyperhydration) and forms depending on serum osmolarity (isotonic, hypertonic hypotonic); to be able to select solutions for intravenous fluid therapy; to know principles of intravenous fluid therapy. 	<p>Hydric sectors (intravascular, extravascular, transcellular, intracellular).</p> <p>Solutions for infusion: characteristics and general indications of use.</p> <p>Fluid compartments (extracellular fluid (intravascular, interstitial, transcellular) and intracellular fluid)).</p> <p>Solutions for intravenous fluid therapy.</p> <p>Hypovolemia and hypervolemia (forms, symptoms, treatment).</p> <p>Hypo- and hypernatremia (etiology, symptoms, treatment).</p> <p>Hypo- and hyperpotasemia (etiology, symptoms, treatment).</p> <p>Tests for detection of latent hypovolemia.</p>
Theme 10. Acid-base disturbances.	
<ul style="list-style-type: none"> to know the acid-base balance parameters; to know pulmonary and renal regulation of acid-base balance; to be able to interpret arterial blood gases in critically ill patients. 	<p>Acid-base balance parameters.</p> <p>Regulation of acid-base balance.</p> <p>Metabolic and respiratory acidosis.</p> <p>Metabolic and respiratory alkalosis.</p>
Theme 11. Acute consciousness disturbances. Brain death. High fidelity simulation at the University Center of Simulation in Medical Training (clinical scenario "Severe traumatic brain injury").	
<ul style="list-style-type: none"> to know the altered levels of consciousness; to know ABCDE approach for the immediate assessment and treatment of comatose patient; to know Monroe-Kellie's doctrine and options for managing raised intracranial pressure; to know factors influencing cerebral blood flow; to know the difference between primary and secondary brain injury; to know the factors that influence secondary brain injury and principles of treatment for patients with altered state of consciousness. 	<p>Degrees of neurological status impairment.</p> <p>Coma etiology.</p> <p>Key concepts in neurologic/neurosurgical intensive care.</p> <p>Determinants of cerebral blood flow and intracranial pressure.</p> <p>Coma diagnosis: medical history, physical examination, neurologic evaluation, paraclinical investigation).</p> <p>General principles of treatment of coma.</p> <p>Brain death: diagnostic criteria. Patient with brain death as potential organ donor.</p>
Theme 12. Acute liver failure.	
<ul style="list-style-type: none"> to know the definition of acute liver failure; to know the causes of acute liver failure; to know the clinical manifestations of acute liver failure; to know the intensive care management of acute liver failure. 	<p>Acute liver failure: definition and causes.</p> <p>Specific therapy of acute liver failure depending on aetiology.</p> <p>Supportive treatment in acute liver failure (hemodynamic failure, respiratory failure, treatment of cerebral edema and intracranial hypertension, bleeding, infection, acute renal failure).</p>



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Objectives	Content units
Theme 13. Acute kidney injury.	
<ul style="list-style-type: none">to know diagnostic criteria for acute kidney injury;to know risk factors and causes of acute kidney injury;to know the most common types of acute kidney injury in critically ill patients;to know management of acute kidney injury;to know indication for renal replacement therapy in ICU.	Acute kidney injury: definition, classification, causes. Diagnostic criteria for acute kidney injury. Risk factors and the most common causes of acute kidney injury in critically ill patients. Clinical manifestations and management of acute kidney injury. Renal replacement therapy. Indications and techniques.
Theme 14. Acute exogenous poisonings. General principles of diagnosis and treatment. Principles of intensive care in intoxications with alcohol, opioids, psychotropic drugs.	
<ul style="list-style-type: none">to know the history of toxicology;to know clinical toxicology, definition of toxic substance, acute exogenous intoxication, classification of toxins, classification of intoxications;to know the principles and peculiarities of diagnosis, treatment of acute exogenous intoxications;to know the peculiarities of intensive care in acute exogenous intoxications.to know the peculiarities of intensive care in acute exogenous intoxications in children and elderly patients.to describe the problem of reversibility of damaged functions of damaged organs and systems;to know the principles of diagnosis, treatment of intoxications with alcohol, opioids, psychotropic drugs.	General toxicology. Principles of clinical, instrumental, laboratory diagnosis of acute exogenous intoxications. Emergency syndromologic, medical assistance at the hospital stage in case of intoxications of unknown origin. Principles and methods of intensive treatment of acute exogenous poisonings. Discontinuation of the toxin. Reversal of injuries caused. Prophylaxis of secondary lesions. Intensive supportive treatment. Peculiarities of intensive care in acute exogenous intoxications in children and elderly patients. The problem of reversibility of damaged functions of damaged organs and systems. Specific toxicology (alcohol, opioids, psychotropic drugs).
Theme 15. Acute exogenous intoxications. Principles of intensive care in carbon monoxide, cyanide, organophosphates, paracetamol, salicylate, mushroom poisonings.	
<ul style="list-style-type: none">Possess knowledge of the specific toxicology of intoxications with hypoxic substances (carbon monoxide, cyanide), and organophosphates;To know aspects of specific toxicology of intoxications with paracetamol, salicylates, poisonous mushrooms..	Specific toxicology - intoxications with hypoxic substances (carbon monoxide, cyanides), and organophosphates. Specific toxicology - paracetamol poisoning, salicylate, mushroom poisoning.



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**VIII. PROFESSIONAL (SPECIFIC (SC)) AND TRANSVERSAL (TC)
COMPETENCES AND STUDY OUTCOMES**

✓ **Professional (specific) competences:**

- PC1. Responsible execution of professional tasks with the application of the values and norms of professional ethics, as well as the provisions of the legislation in force.
- PC2. Adequate knowledge of the sciences about the structure of the body, physiological functions and behavior of the human body in various physiological and pathological conditions, as well as the relationships between health, physical and social environment.
- PC3. Resolving clinical situations by developing a plan for diagnosis, treatment and rehabilitation in various pathological situations and selecting appropriate therapeutic procedures for them, including providing emergency medical care.
- PC4. Promoting a healthy lifestyle, applying prevention and self-care measures.
- PC5. Interdisciplinary integration of the doctors activity in a team with efficient use of all resources.
- PC6. Carrying out scientific research in the field of health and other branches of science.

✓ **Transversal competences (TC)**

- ✓ TC1. Autonomy and responsibility in the activity.

✓ **Study outcomes**

- To know definition of critically ill patients and criteria for ICU admission.
- To know the peculiarities of diagnosis, monitoring and treatment of critically ill patients (patients with acute respiratory failure, acute heart failure, acute liver failure, acute consciousness disturbances, shock).
- To know intensive care unit management of severe poisonings.
- To know anesthetic techniques (general and locoregional anesthesia) and drugs used for general anesthesia and locoregional anesthesia;
- To assess anesthetic risk and to be able to manage the patient in preoperative period, to perform orotracheal intubation on the manikin and to be able to use modern equipment (anesthetic machine, monitors, syringe pumps, oxygen delivery devices).
- To know the organizational structure of Anesthesia and Intensive Care Units.



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IX. STUDENT'S SELF-TRAINING

No.	Expected product	Implementation strategies	Assessment criteria	Implementation terms
1.	Working with information sources	To know where to look for information, how to access it and how to use it (monographs, scientific articles, the Internet), to read texts carefully, synthesize relevant information.	Ability to extract the important information, the volume of work.	During the course
2.	Preparing and making presentations	To prepare a presentation in PowerPoint: title, purposes, results, conclusions, practical applications, bibliography.	The structure of presentation, connections with other disciplines, originality of the presentation, credibility of sources, proper image use, correct use of terms, keeping to time.	During the course

X. METHODOLOGICAL SUGGESTIONS FOR TEACHING-LEARNING-ASSESSMENT

✓ *Teaching and learning methods used*

The course "Anesthesiology and reanimatology. Toxicology" is held in a classical manner: lectures and practical classes. Professors deliver the lectures using multimedia presentations. During the practical classes students can see the work in the operating rooms, intensive care units, observe general and loco-regional anesthesia techniques, as well as management of critically ill patients. Students discuss theoretical material, debate clinical cases and problem solving situations. Students strengthen their theoretical and practical knowledge by clinical case simulations at the University Center of Simulation in Medical Training (CUSIM).

✓ *Applied teaching strategies / technologies*

Interactive lectures, questioning, brainstorming, individual study, work with textbook and scientific articles, discussion, discussion of clinical cases, simulation session.

✓ *Methods of assessment*

Current: Different types of assessment methods are used: oral answers, written tests, case studies. Throughout the course, students' knowledge is assessed by 3 tests, which include all the study material. During the course student's knowledge is assessed on a 10 point scale (grade ranging from 0 to 10). Students with the average mark less than 5 and students with absences at practical classes are not admitted to the final exam.

Final:

Upon completion of the course, students pass an exam, which consists of two tests: computerized test and oral test.

The subjects for the exam (tests and theoretical questions) are discussed and approved at the chair meeting. The oral test consist of answering to two questions and is marked with grades from 0 to 10.



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Computerized test consists of tests covering all the topics (40% of tests are simple and 60% - multiple choice questions). Computer test is scored with marks from 0 to 10.

The final mark consists of the average mark of three tests (coefficient 0.5), computerized test (coefficient 0.2) and oral test (coefficient 0.3).

Method of mark rounding at different stages

Intermediate marks scale (annual average, marks from the examination stages)	National Assessment System	ECTS Equivalent
1,00-3,00	2	F
3,01-4,99	4	FX
5,00	5	E
5,01-5,50	5,5	
5,51-6,0	6	
6,01-6,50	6,5	D
6,51-7,00	7	
7,01-7,50	7,5	C
7,51-8,00	8	
8,01-8,50	8,5	B
8,51-9,00	9	
9,01-9,50	9,5	A
9,51-10,0	10	

The average mark of three tests, and the marks received at the oral test, and the computer-based test are expressed in numbers according to the mark scale (according to the table), and the final grade is expressed in number with two decimals, which is transferred to student's record-book.

XI. RECOMMENDED LITERATURE:

A. Compulsory:

1. P.G. Barash et al. Handbook of Clinical Anesthesia, 2013
2. Marino P.L. The ICU book, 2014.
<https://ia802501.us.archive.org/0/items/MarinosTheICUBook4thEd/Marino%27s%2C%20The%20ICU%20Book%2C%204th%20ed.pdf>
3. Matava Clyde, Ahtsham Niazi Anesthesia for medical students. A Concise Clerkship Manual for Medical Students 2017.
http://pie.med.utoronto.ca/anesthesiaqr/AnesthesiaQR_Content/assets/pdfs/Anesthesia%20for%20Medical%20Students%20Manual%202019-20.pdf

B. Additional:

1. Oxford handbook of anaesthesia, 2011.
2. Hines R.L., Marschall K.E. Handbook of Stoelting's anesthesia and coexisting disease, 2013
3. Raymer K. Understanding Anesthesia. A Learner's Handbook, 2013.
https://anesthesiology.queensu.ca/source/UnderstandingAnesthesia1_1_2.pdf