

DANYLO HALYTSKY LVIV NATIONAL MEDICAL UNIVERSITY

Department of Anesthesiology and Intensive Care



**"APPROVED"**  
First Vice-Rector on  
Scientific and Pedagogical Work  
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*[Signature]*  
2023

**PROGRAM of the ACADEMIC DISCIPLINE**

**ББ 1.61 "Actual Questions of Pediatric Anesthesiology"  
5th year of education**

**Second (master's) degree of higher education  
Field of Knowledge 22 "Healthcare"  
Specialty 228 "Pediatrics"**

Discussed and approved at the educational-  
methodical meeting of the Department of  
Anesthesiology and Intensive Care  
Minutes No 7/2/23 dated 21 Mar 2023  
Head of the Department  
*[Signature]* Assoc.Prof. Roman Verbovsky



Approved  
by the Profile Methodical Board on Surgical  
Disciplines  
Minutes No 20 dated 27 Apr 2023  
Head of the Board  
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## INTRODUCTION

The study program of the academic discipline "**Actual Questions of Pediatric Anesthesiology**" is compiled in accordance with the Educational and Professional Program " BB 1.61" of the Standard of Higher Education of Ukraine of the second (master's level) field of knowledge 22 "Health Care" specialty 228 "Pediatrics".

### Description of the academic discipline (abstract)

"**Actual Questions of Pediatric Anesthesiology**" as an educational discipline is an integral part of clinical medicine, therefore, studying the basic provisions of this branch of science is an important point in the training of a doctor of pediatric specialty.

It lays the foundations for the study by students of emergency conditions that can occur in the clinic of pediatrics, pediatrics surgery, traumatology and orthopedics, obstetrics and other educational disciplines where methods of analgesia and intensive care are used, which involves the integration of teaching with these disciplines and the formation of skills to apply knowledge in the process of further education and professional activity.

Provides an opportunity to acquire practical skills and develop professional skills for diagnosis and provision of emergency medical care and intensive therapy of children in certain pathological conditions and during the period of patient care. The assimilation of theoretical material is accompanied by the acquisition of relevant integral, general and professional competencies.

Types of educational activities of students are: a) lectures, b) practical classes, c) independent work of students (IWS), in the organization of which teachers' consultations play a significant role.

Practical clinical classes include:

- examination of patients in the intensive care unit with discussion of the plan and tactics of their treatment;

- examination of patients scheduled for surgery, work in the operating room;

- mastering special practical skills on phantoms and mannequins;

- practical use of diagnostic methods and intensive treatment;

- solving clinical situational problems and tests.

Current educational activities of students are monitored in practical classes in accordance with specific goals and during individual work of the teacher with students.

It is recommended to apply the following methods of determining the level of students' training:

1. computer tests;

2. solving clinical cases;

3. assessment and interpretation of clinical laboratory and instrumental examinations;

4. control of practical skills

5. oral survey.

The final control of the learning of the module is carried out after its completion at the final control session.

The evaluation of the student's success in the discipline is a rating and is presented on a multi-point scale as the average arithmetic evaluation of the module's mastery and is defined according to the ECTS system and the traditional scale adopted in Ukraine.

### Content of Study Program on **Actual Questions of Pediatric Anesthesiology**

Structure of discipline	Hours, in particular:				Year of education	Control type
	Total	Auditory		Independent work		
		Lectures	Practical classes			
	90	10	36	44	5th	Differentiated

						credit (final MSQ test)
Credits ECTS	3,0					

The subject of study of the educational discipline is the basics of anesthesiology and intensive therapy; clinic, diagnostics, first aid, principles of treatment of critical conditions that arise in the clinic of pediatrics, pediatrics surgery, traumatology and orthopedics, urology, obstetrics.

**Interdisciplinary connections.** The discipline "**Actual Questions of Pediatric Anesthesiology**" is based on the knowledge gained by students during the study of such fundamental disciplines as human anatomy; histology, biochemistry, physiology, pathomorphology; pathophysiology; propaedeutics of internal medicine, pediatrics, pharmacology and integrates with these disciplines.

## 1. GOALS AND PURPOSES OF THE DISCIPLINE

Studying **Actual Questions of Pediatric Anesthesiology** will help students to get a complete understanding of anesthesiology and intensive care as an independent section of clinical discipline that studies and develops the theory and practice of protecting the body from extreme influences (aggression) and uses common methods for regulating or temporarily substitution of vital functions when they are injured (terminal states, anesthesia, special research methods, etc.).

1.1. The **purpose** of teaching the educational discipline "**Actual Questions of Pediatric Anesthesiology**" is to acquire theoretical and practical knowledge of etiology, pathogenesis, classification, clinical manifestations, methods of diagnosis, intensive therapy of the main syndromes accompanying severe violations of vital functions. Studying the etiology, pathogenesis, pathophysiology of clinical death and terminal conditions and mastering the elements of cardiopulmonary resuscitation, which allows to restore the adequate functioning of life support systems. The student's acquisition of knowledge and professional skills in anesthesiological provision of operative interventions in various fields of pediatric medicine.

1.2. The main **tasks** of studying the discipline "**Actual Questions of Pediatric Anesthesiology**" are:

- to teach students the main syndromes accompanying severe violations of vital functions;
- diagnose and provide medical assistance in emergency situations;
- interpret the general principles of intensive therapy in emergency situations;
- draw up an examination plan and interpret the results of laboratory and instrumental examination methods;
- demonstrate the ability to perform the necessary medical manipulations;
- be able to establish a diagnosis of clinical death and carry out resuscitation measures;
- demonstrate the ability to maintain medical documentation;
- possess the moral and deontological principles of professional subordination.

1.3 **Competencies and learning outcomes**, the formation of which contributes to the discipline (interrelationship with the normative content of the training of higher education applicants, formulated in terms of learning outcomes in the Standard).

According to the requirements of the standard, the discipline ensures students' acquisition competencies:

**Integral:** The ability to solve complex problems, including those of a research and innovation nature in the field of medicine. Ability to continue learning with a high degree of autonomy..

### **General competencies:**

1. ability to abstract thinking, analysis and synthesis;
2. the ability to learn and master modern knowledge;
3. ability to apply knowledge in practical situations;
4. know and understand the subject area and understand professional activity;

5. ability to adapt and act in a new situation;
6. ability to make a decision;
7. ability to work in a team;
8. ability to interpersonal communication.
11. ability to search, process and analyze information from various sources.
12. determination and persistence in relation to assigned tasks and assumed responsibilities.

**Special (professional) competencies:**

1. Ability to collect medical information about the patient and analyze clinical data.
2. Ability to determine the necessary list of laboratory and instrumental studies and evaluate their results.
3. The ability to establish a preliminary and clinical diagnosis of the disease.
5. The ability to determine the nature of nutrition in the treatment and prevention of diseases.
6. Ability to determine the principles and nature of treatment and prevention of diseases.
7. Ability to diagnose emergency conditions.
8. Ability to determine tactics and provide emergency medical care.
10. Ability to perform medical manipulations.
11. Ability to solve medical problems in new or unfamiliar environments in the presence of incomplete or limited information, taking into account aspects of social and ethical responsibility.
16. Ability to maintain medical documentation, including electronic forms.
18. The ability to analyze the activity of a doctor, unit, health care institution, ensure the quality of medical care and increase the efficiency of the use of medical resources.
21. Clearly and unambiguously communicate one's own knowledge, conclusions and arguments on health care problems and related issues to specialists and non-specialists, in particular to students.
22. Ability to manage healthcare workflows that are complex, unpredictable and require new strategic approaches.
23. Ability to develop and implement scientific and applied projects in the field of health care.
24. Compliance with ethical principles when working with patients and laboratory animals.
25. Observance of professional and academic integrity, bear responsibility for the reliability of the obtained scientific results.

**Detailing of competencies in accordance with the descriptors in the form of "Matrix of competencies".**

№	Competence	Knowledge	Skill	Communication	Autonomy and responsibility
1	2	3	4	5	6
Integral competence					
The ability to solve complex problems, including those of a research and innovation nature in the field of medicine. Ability to continue learning with a high degree of autonomy.					
General Competence					
1	Ability to abstract thinking, analysis and synthesis	Know the ways of analysis, synthesis and further modern teaching	To be able to analyze information, make substantiated decisions, to be able to accept modern knowledge	Establish corresponding connections for achieving goals.	Be responsible for timely acquisition of modern knowledge
2	Ability to learn and master modern knowledge	Know and analyze modern trends of development of the industry	Be able to analyze professional information, make substantiated decision to acquire modern knowledge	Establish corresponding connections for achieving goals	Be responsible for timely acquisition of modern knowledge
3	Ability to apply knowledge in practical situations	Have specialized conceptual knowledge, acquired in the process of learning	Be able to solve complex tasks and problems which arise in professional activity	Clear and unambiguous presentation of conclusions, knowledge and explanations to specialists and non-specialists	To be responsible for decision-making in difficult conditions
4	To know and understand the subject area and understand professional activity	Have knowledge of the structure professional activity	Be able to carry out professional activity that needs update and integration of knowledge	Ability effectively form communication strategy in professional activity	Be responsible for professional development, ability to further professional learning with high level of autonomy

5	Ability to adapt and act in a new situation	Know the types and methods of adaptation, principles of action in a new situation	Be able to apply self-regulation, to be able to adapt to new situations (circumstances) of life and activity	Establish appropriate connections to achieve results	Be responsible for timely using of methods self-regulation
6	Ability to make a decision	Know communication tactics and strategies, laws and methods communicative behavior	Be able to accept justified decision, choose methods and communication strategies for ensuring effective teamwork	Use communication strategies and skills interpersonal interaction	To be responsible for the choice and tactics of the method of communication that ensures decision-making
7	Ability to work in a team	Know communication tactics and strategies, laws and methods communicative behavior	Be able to accept justified decision, choose methods and communication strategies for ensuring effective teamwork	Use communication strategies	To be responsible for the choice and tactics of the method of communication
8	Ability to an interpersonal communications	Know the laws and methods of interpersonal interaction	To be able to choose methods and strategies communication for interpersonal interaction	Use interpersonal skills	To be responsible for the choice and tactics of the method of communication
11	Ability to search, process and analyze information from various sources	Have knowledge in the field of information technologies, which are used in professional activity	Be able to use informative and in professional industry that needs update and integration of knowledge	Use information in professional activity	To be responsible for development professional knowledge and skills
12	Determination and persistence in relation to assigned tasks and assumed responsibilities	Know the responsibilities and ways of implementation assigned tasks	To be able to determine purpose and task, to be persistent and conscientious in the performance responsibilities	Establish interpersonal relationships for effective performance task and responsibilities	To be responsible for quality performance assigned tasks

Special (professional) competences

1	Ability to collect medical information about the patient and analyze clinical data	Know complaints and sequence information taking about the disease in the patient	Be able to consistently collect all information about the patient's illness	Ability to establish interpersonal relationships	To be responsible for the implementation of ethical and deontological norms
2	Ability to determine the necessary list of laboratory and instrumental studies and evaluate their results	Have specialized knowledge about laboratory and instrumental research (according to the list 4)	To be able to analyze the results of laboratory and instrumental research methods (according to the list 4)	The ability to convey to the patient, the patient's relatives and specialists conclusions regarding the list and results of research (according to the list 4)	Be responsible for correctness and timeliness conducting relevant assessments and interpretation of their results
3	Ability to establish preliminary and clinical diagnosis of the disease	Have specialized knowledge about a person, her bodies and systems; knowledge of standard survey methods; disease diagnosis algorithms; algorithms for selection of leading symptoms or syndromes (according to list 1); preliminary and clinical diagnoses (according to list 2); knowledge of laboratory methods and instrumental examination (according to the list 3); knowledge about the assessment of the human condition.	Be able to establish the most likely or syndromic diagnosis (according to list 2) by making a reasoned decision, with the help of juxtaposition with standards, do I use previous patient history data and patient examination data, on on the basis of the leading clinical symptom or syndrome, I use the knowledge about the person, his organs and systems, observing the appropriate ones ethical and legal norms.	On the basis of regulatory documents, conduct medical patient documentation (outpatient/inpatient card, etc.)	Adhering to ethical and legal norms, bear responsibility for making informed decisions and actions regarding the correctness of the established preliminary clinical diagnosis of the disease
5	The ability to determine the nature	Have specialized	Be able to determine the	Form and convey to the patient	To be responsible for



	of nutrition in the treatment and prevention of diseases	knowledge about a person, his organs and systems, anatomic-physiological and age-related features; algorithms and standard schemes for the appointment of food - in the treatment of diseases (according to list 2)	nature of nutrition on the basis of a preliminary and clinical diagnosis, the nature of nutrition in the treatment of diseases (according to list 2)	conclusions about nutrition - in the treatment of diseases (according to list 2)	the reasonableness of determining nutrition - in the treatment of a disease (according to list 2)
6	Ability to determine the principles and nature of treatment and prevention of diseases	Have specialized knowledge of algorithms and standard disease treatment schemes (according to list 2)	Be able to determine the principles and nature of disease treatment (according to list 2)	Form and convey to the patient own conclusions regarding the principles and nature of treatment (according to list 2)	Be responsible for making a decision regarding the principles and nature of the treatment of the disease (according to list 2)
7	Ability to diagnose emergency conditions	Have knowledge of clinical manifestations and stages of development of acute medical conditions	Be able to quickly detect and diagnose acute medical conditions, be able to organize the appropriate diagnostic program	Use communication strategies and skills of the interpersonal interaction	Be responsible for timely detection and evaluation of urgent medical condition of the patient
8	Ability to determine tactics and provide emergency medical care	Have specialized knowledge about urgent medical conditions; know algorithms for providing the first medical aid	Be able to consistently and correctly perform the measures of the first medical help according to urgent condition	Use communication strategies and skills of the interpersonal interaction	Be responsible for correctness and consistency providing the first medical assistance
10	Ability to perform medical manipulations.	Have specialized knowledge of anatomy and normal physiology. To know algorithms of performance of medical	To be able to perform medical procedure or perform a medical manipulation according to the algorithm	Reasonably form and bring conclusions to the patient of necessity of performing of medical procedures or manipulations	To be responsible for quality of performance of medical procedures or manipulations

		manipulations: measurement and interpretation arterial pressure, venipuncture, catheterization of ulnar vein, external jugular vein, intraosseous access, intravenous infusion, subcutaneous, intramuscular injection, catheterization of urinary bladder, washing stomach			
11	Ability to solve medical problems in new or unfamiliar environments in the presence of incomplete or limited information, taking into account aspects of social and ethical responsibility	Have specialized knowledge about a person, his organs and systems, anatomical and physiological and age-related features; knowledge of immunopathological syndromes	Be able to diagnose an immune-dependent disease or allergic reaction, make decisions about further outpatient or inpatient treatment	Reasonably formulate and prove to the patient or his legal representative the need to find the nearest medical facility and conduct the most necessary examinations there	To be responsible for the correctness of establishing the patient's condition, the degree of its severity and the tactics of the primary examination
16	Ability to maintain medical documentation, including electronic forms.	Know the system of official document flow in the work of a doctor, including modern computer information technologies	Be able to determine the source and location of the required information depending on its type; Be able to process information and analyze the received information	Obtain the necessary information from a specified source and, based on its analysis, form appropriate conclusions	Be responsible for the completeness and quality of information analysis and conclusions based on its analysis
18	The ability to analyze the activity of a doctor, unit, health care institution, ensure the quality of	Know the main indicators that characterize the activities of security institutions/units	Be able to calculate the main indicators of the activity of a doctor, unit, health care	Receive information from relevant sources about the activities of a doctor, unit, health care institution,	To be responsible for the validity of decisions regarding the improvement of

	medical care and increase the efficiency of the use of medical resources.	health; medical-organizational factors that affect the activity of the doctor of the unit, health care institution; characteristics and quality of medical care; components of improving the quality of medical care; basic requirements for standardization of medical care. Know the effectiveness of various forms of organization of medical assistance;	institution and evaluate them dynamically. Be able to detect activity defects and the reasons for their formation. Be able to: choose an appropriate unified clinical protocol for providing medical care; to develop a general scheme of the local protocol for the provision of medical assistance; calculate indicators of the structure, process and results of activity	inform relevant officials to ensure conditions for providing quality medical care. Formulate conclusions regarding the justification of the form organization of medical assistance.	the activities of the doctor and the health care institution; increasing the efficiency of the use of available resources of the unit, institution, health care system.
21	Clearly and unambiguously communicate one's own knowledge, conclusions and arguments on health care problems and related issues to specialists and non-specialists, in particular to students.	Know the main approaches to the organization of training students on health care problems and related issues	To be able to organize the education of students on the problems of health care and related issues	Reasonably formulate and prove the need for training specialists and non-specialists in health care problems and related issues	To be responsible for the reasonableness of conveying one's own knowledge, conclusions and arguments
22	Ability to manage healthcare workflows that are complex, unpredictable and require new strategic approaches.	Know the main approaches to the organization of complex work processes in the field of health care	To be able to organize and manage complex and unpredictable processes in the field of health care	Reasonably formulate and prove the complexity of health care organization	Be responsible for the validity of new strategic approaches
23	Ability to develop and implement scientific and	Know the main approaches to the development and	To be able to organize scientific and	Reasonably formulate the expediency of	To be responsible for the validity of

	applied projects in the field of health care.	implementation of scientific and applied projects in the field of health care	applied projects in the field of health care	developing scientific and applied projects in the field of health care	scientific projects in the field of health care
24	Compliance with ethical principles when working with patients and laboratory animals.	To know the main approaches to the presentation of permission documents for work with patients, laboratory animals and animals to ethics commissions	To be able to organize the work of ethics commissions	Reasonably formulate the expediency of using biomaterials in scientific research	To be responsible for the validity of one's actions
25	Observance of professional and academic integrity, bear responsibility for the reliability of the obtained scientific results.	Know the basics of professional and academic integrity	To be able to ensure professional and academic integrity in the team	To justify the expediency of observing professional and academic integrity	To justify the expertise of observing professional and academic integrity

	GC1	GC2	GC3	GC4	GC5	GC6	GC7	GC8	GC9	GC10	GC11	GC12	GC13	GC14	GC15
OK 42.1	+	+	+	+	+	+	+	+			+	+			

	SC1	SC2	SC3	SC4	SC5	SC6	SC7	SC8	SC9	SC10	SC11	SC12	SC13	SC14	SC15	SC16	SC17	SC18	SC19	SC20	SC21	SC22	SC23	SC24	SC25
OK 42.1	+	+	+		+	+	+	+		+	+					+		+			+	+	+	+	+

**Learning outcomes:**

**Integrative final program learning outcomes, the formation of which is facilitated by the educational discipline "Actual Questions of Pediatric Anesthesiology":**

1. Have thorough knowledge of the structure of professional activity. To be able to carry out professional activities that require updating and integration of knowledge. To be responsible for professional development, the ability for further professional training with a high level of autonomy.

2. Understanding and knowledge of fundamental and clinical biomedical sciences at a level sufficient for solving professional tasks in the field of health care.

3. Specialized conceptual knowledge, which includes scientific achievements in the field of health care and is the basis for conducting research, critical understanding of problems in the field of medicine and interdisciplinary problems related to it.

4. To highlight and identify leading clinical symptoms and syndromes (according to list 1);

according to standard methods, using data from the patient's history, examination of the patient, knowledge about the person, his organs and systems, establish a preliminary diagnosis of the disease (according to list 2).

5. Collect complaints, anamnesis of life and diseases, evaluate the psychomotor and physical development of the patient, the state of organs and systems of the body; based on the results of laboratory and instrumental studies, evaluate information regarding the diagnosis (according to list 4), taking into account the age and gender of the patient.

6. Establish a final clinical diagnosis by making a reasoned decision and analyzing the received subjective and objective data of clinical and additional examinations, carry out differential diagnosis; comply with relevant ethical and legal norms; to work under the supervision of a managing physician in the conditions of a health care facility (according to list 2).

7. Prescribe and analyze additional (mandatory and additional) examination methods (laboratory, functional and/or instrumental) (according to list 4) for patients with diseases of organs and body systems for differential diagnosis (according to list 2).

8. Determine the leading clinical syndrome or establish what determines the severity of the condition of the victim/victim (according to list 3) by making a reasoned decision and assessing the person's condition under any circumstances (in the conditions of a health care facility and outside of it, including h. in conditions of an emergency and hostilities, in field conditions, in conditions of lack of information and limited time).

9. Determine the nature and principles of treatment (conservative, operative) of patients with diseases according to list 2, taking into account the age and gender of the patient, in the conditions of the health care institution and outside it, including during the stages of medical evacuation and in field conditions, on the basis of a previously established clinical diagnosis, observing relevant ethical and legal norms, by making a reasoned decision according to existing algorithms and standard schemes; in case of need to expand the standard scheme, be able to substantiate personalized recommendations under the control of the head physician in the conditions of a medical institution.

10. To determine the necessary mode of work, rest and nutrition of the patient on the basis of the preliminary and/or final clinical diagnosis, observing the relevant ethical and legal norms, by making a reasoned decision according to the existing algorithms and standards.

14. Determine tactics and provide emergency medical care in emergency situations (according to list 3) in limited time in accordance with existing clinical protocols and standards.

16. Form rational medical routes for patients; organize interaction with colleagues in their own and other institutions, organizations and institutions; to apply tools for the promotion of medical services in the market based on the analysis of the needs of the population, in the conditions of a health care institution, its division and in a competitive environment.

17. To perform medical manipulations (according to list 5) in the conditions of a medical institution, at work and at the patient's home based on a previous clinical diagnosis and/or indicators of the patient's condition by making a reasoned decision, observing the relevant ethical and legal norms.

21. Find the necessary information in the professional literature and databases of other sources, analyze, evaluate and adequately apply this information.

24. To ensure the necessary level of individual safety (your own and the people you care about) in case of typical dangerous situations in the individual field of activity.

25. Clearly and unambiguously communicate one's own knowledge, conclusions and arguments on health care problems and related issues to specialists and non-specialists.

**As a result of studying the academic discipline "Actual Questions of Pediatric Anesthesiology", the student should know (in accordance with the OPP appendix):**

- general principles and methods of anesthesiological support for surgical interventions;
- etiology, pathogenesis, pathophysiology of clinical death and terminal conditions;

- methods of diagnosis and clinical course of the main syndromes accompanying severe violations of vital functions;
- algorithms of intensive therapy nev emergency conditions (hypertensive crisis, hypoglycemia, acute respiratory failure, acute adrenal insufficiency, acute kidney damage, acute liver failure, acute heart failure, acute poisoning, including combat poisons, acute coronary syndrome, acute cerebral insufficiency, diabetic coma , including ketoacidotic, hyperosmolar, lacticidemic, electric trauma, status epilepticus, acute bleeding, acute blood loss syndrome, including in field conditions and in emergency situations, sudden cardiac arrest, collapse, unconsciousness and comatose states, acute anaphylactic reactions, acute heart rhythm disturbances, cold injury, including in field conditions, heat injury, including in field conditions, venous and arterial thromboembolism, convulsive syndrome, drowning, strangulation asphyxia, shocks, snake bites, insects , care animals, including in field conditions, foreign bodies of the respiratory tract).

**As a result of studying the educational discipline "Actual Questions of Pediatric Anesthesiology", the student should be able to (according to the OPP application):** indirect heart massage, artificial respiration, defibrillation using a manual automatic defibrillator-cardioverter, registration of a standard 12-lead ECG, temporary stoppage of external bleeding, hemostatic tourniquets and use hemostatic agents, including in field conditions, to install a nasogastric and orogastric tube, transport immobilization, administration of medicinal substances (intravenous jet and drip, intraosseous), incl. in the field, provide peripheral venous access, measure blood pressure, restore airway patency, catheterize the urinary bladder with a soft probe, pleural puncture, determine blood groups, Rh-affinity, transfuse blood components and blood substitutes, take swabs for bacterioscopic, bacteriological, cytological examination.

**2. Volume of the academic discipline - 3 ECTS credits/90 hours.**

**3. Structure of the discipline**

#### Seminars

Theme N.	Theme	N of academic hours
Cardio-pulmonary resuscitation and Anesthesiology		
1	Cardio-Pulmonary and Cerebral Resuscitation	3,6
2	General Anesthesiology	3,6
3	Clinical Anesthesiology	3,6
General Intensive Care		
4	Diagnosis and Management of Fluid, Electrolyte and Acid-Base Balance Disorders	3,6
5	Acute Renal Failure. Acute Hepatic Failure.	3,6
6	Acute Poisonings and Comatose Conditions.	3,6
Intensive Care of Critical Conditions		
7	Acute Respiratory Failure	3,6
8	Diseases of the Respiratory System	3,6
9	Acute Disorders of Circulation	3,6
10	Shock and Traumatic Injuries	3,6
	Total	36

#### Lectures

1	Clinical Anesthesiology.	2
2	Acute Respiratory Failure.	2

3	Acute Poisonings.	2
4	Acute Renal Failure. Acute Hepatic Failure.	2
5	Shock	2
	Total	10

### Independent work

Theme No.	Theme	No. of academic hours
1	CPR	4
2	General Anesthesiology	4
3	Clinical Anesthesiology	4
4	Diagnosis and Management of Fluid, Electrolyte and Acid-Base Balance Disorders	4
5	Acute Renal Failure. Acute Hepatic Failure.	4
6	Acute Poisonings and Comatose Conditions.	4
7	Acute Respiratory Failure	6
8	Diseases of the Respiratory System	4
9	Acute Disorders of Circulation	6
10	Shock and Traumatic Injuries	4
	Total	44

### Theme 1. Cardio-Pulmonary and Cerebral Resuscitation

1. Development of intensive care in Ukraine and in the world.
2. Organization of intensive care in Ukraine.
3. Causes of primary cardiac arrest.
4. Stages of cardio-pulmonary and cerebral resuscitation.
5. Immediate stage of cardio-pulmonary and cerebral resuscitation.
6. Signs of clinical death.
7. Causes of airway obstruction and airway management techniques.
8. Mechanical pulmonary ventilation technique and chest compressions.
9. Resuscitation efficiency evaluation.
10. Types of circulatory arrest.
11. Use of medications and routes of drug administration during resuscitation. ECG-based diagnosis of the type of cardiac arrest.
12. Indications for defibrillation and open-chest cardiopulmonary resuscitation.
13. Defibrillation technique and safety during defibrillation.
14. The 3rd stage of cardio-pulmonary and cerebral resuscitation.
15. Patient assessment methods and evaluation of likelihood of survival.
16. Pathogenesis and clinical course of post-arrest disease.
17. Decortication, decerebration, brain death. Clinical signs, biochemical methods and tests used to diagnose brain death.
18. Euthanasia. Problem of life and death.
19. Interaction between intensivists, related medical specialists and patients' families.
20. Deontology. Issues, ethical and legal problems.
21. Intensive care management of post-arrest disease: improvement of tissue perfusion, management of low-output syndrome, improvement of blood reology, restoration of gas exchange and correction of metabolic disturbances.
22. Intensive care management of cerebral oedema.

23. Improvement of cerebral metabolism and management of reperfusion-related complications. Restoration of the integrative function of the brain.
24. Resuscitation of children of different age (newborns, infants, children over 1 year) and the elderly patients.

### **Theme 2. General Anesthesiology**

1. Anesthesiology as a scientific and practical medical specialty focused on analgesia and management of vital functions.
2. The role of anesthesiology in the modern system of medical knowledge.
3. Development of anesthesiology in Ukraine and in the world. Organization of anesthetic management in Ukraine.
4. Types of general anesthesia.
5. Theories explaining the nature of general anesthesia.
6. Classification of modern methods of anesthesia.
7. Components and methods of anesthesia: analgesia, sedation, muscle relaxation, maintenance of adequate ventilation and gas exchange, circulation and metabolism.
8. Inhalational anesthesia. Equipment and instruments used for inhalational anesthesia.
9. Inhaled anesthetics: ether, halothane.
10. Stages and clinical characteristics of general anesthesia.
11. Non-inhalational anesthesia. Non-inhalational anesthetics: ketamine, thiopental sodium, gamma-hydroxy butyrate, propofol.
12. Regional anesthesia. Types and methods of regional anesthesia.
13. Technique and methods of epidural puncture and catheterization.
14. Peculiarities of out-patient and urgent general anesthesia.
15. Choice of the method of analgesia for urgent surgery.
16. Preparation of patients for surgery and anesthesia.
17. Complications of general and regional anesthesia.
18. Occupational hazards in anesthesiology.

### **Theme 3. Clinical Anesthesiology**

1. Choice of anesthesia for head and neck surgery. General anesthesia in neurosurgery.
2. Choice of anesthesia for thoracic surgery.
3. Choice of anesthesia for abdominal surgery.
4. Choice of anesthesia for trauma and orthopedic surgery.
5. General anesthesia in obstetrics and gynecology: anesthesia for labor, general anesthesia for small obstetrical procedures, anesthesia for cesarean section.
6. Physiological peculiarities of anesthesia for children and elderly patients.
7. Intensive care and preparation of patients for surgical treatment of antrum stenosis, ileus, peritonitis, pancreatitis. Intensive care in the early post-operative period.

### **Theme 4. Diagnosis and Management of Fluid, Electrolyte and Acid-Base Balance**

#### **Disorders**

1. Physiology of homeostasis.
2. Pathophysiology of fluid-electrolyte and acid-base balance.
3. Homeostatic functional system, molarity, osmolarity.
4. Fluid balance disorders – etiology, diagnosis and correction.
5. Electrolyte disorders – Na, K, Cl, Ca; etiology and correction.
6. Physiologic pathways of acid-base balance regulation.
7. Types of acid-base imbalance, methods of diagnosis and intensive treatment of metabolic acidosis and metabolic alkalosis.
8. Types of acid-base imbalance, methods of diagnosis and intensive treatment of respiratory acidosis and respiratory alkalosis.
9. Diagnosing of hypovolemia.



10. Haemocorrecting medications, indications and contraindications for use.
11. Infusion therapy: ways of infusions, basic principles, peculiarities in childhood and elderly patients.
12. Complication of infusion therapy
13. Basic principles of parenteral feeding. Drugs and rules of parenteral feeding, control of effectiveness, peculiarities in childhood and elderly patients.

**Theme 5. Acute Renal Failure. Acute Hepatic Failure.**

1. Anatomy and physiology of the urinary system.
2. Acute renal failure: classification and pathophysiology.
3. Clinical, physiological and biochemical disorders in ARF. Methods of diagnosis.
4. Intensive care of different stages of ARF.
5. Extracorporeal detoxication (haemodialysis, haemofiltration, ultrafiltration, peritoneal dialysis).
6. Etiology and pathophysiology of acute hepatic failure.
7. Clinical features and treatment of acute hepatic failure.

**Theme 6. Acute poisonings and comatose conditions.**

1. The notion of acute poisonings.
2. Classification of poisonings.
3. General principles of management in acute poisoning.
4. Intensive care management of acute poisonings: tranquilizers, opiates, barbiturates, organophosphates, ethanol, methanol, carbon monoxide, acids, alkali, poisonous mushrooms. Extracorporeal detoxication methods.
5. Emergency care for insect and animal bites.
6. Differential diagnosis of coma.
7. Coma depth determination.
8. Intensive care management of different types of coma (hypoglycemic, hyperglycemic, hyperosmolar, hepatic, uremic).
9. Intensive care management of cerebral oedema, seizures and hyperthermia in children.

**Theme 7. Acute Respiratory Failure (ARF)**

1. Physiology of respiration. Non-respiratory functions of the lungs.
2. Anatomy and physiology of respiration in children and elderly patients.
3. Etiology, pathogenesis, classification and clinical course of ARF, diagnostic algorithms.
4. Types, clinical signs and diagnosis of hypoxia.
5. Clinical signs of hypercapnia.
6. Methods of intensive care of ARF.
7. Airway management techniques.
8. Methods of pulmonary drainage.
9. Management of hypoxemia.
10. Method of supplemental oxygen delivery.
11. Indication for constant positive airway pressure (CPAP) in spontaneous ventilation.
12. Indications for mechanical ventilation.
13. Contraindications and possible complications of mechanical ventilation.
14. Hyperbaric oxygenation.
15. Peculiarities of intensive care management of acute respiratory failure in children.

**Theme 8. Diseases of the Respiratory System.**

1. Intensive care of postoperative acute respiratory failure.
2. Intensive care of acute respiratory failure due to pneumonia.
3. Intensive care of acute respiratory failure due to status asthmaticus.
4. Intensive care of acute respiratory failure due to pulmonary edema.
5. Intensive care of acute respiratory failure due to near-drowning.

6. Intensive care of acute respiratory failure due to pulmonary embolism.
7. Intensive care of acute respiratory failure due to massive aspiration.
8. Intensive care of acute respiratory failure due to adult acute respiratory syndrome.
9. Intensive care of acute respiratory failure due to neonatal acute respiratory distress syndrome.

**Theme 9. Acute Disorders of Circulation.**

1. Physiology and pathophysiology of circulation.
2. Systemic transport of oxygen as a marker of circulation adequacy.
3. Pathophysiology and pathogenesis of acute circulatory disorders.
4. Types of critical discirculation: cardiac and vascular failure, hypovolaemia.
5. Criteria of microcirculatory disorders.
6. Etiology, clinical manifestation and diagnosis of acute heart failure; basic principles of intensive care of AHF.
7. Etiology, clinical manifestation and diagnosis of cardiac arrhythmias; basic principles of intensive care.
8. Functioning of cardiovascular system and treatment of its disorders at different age.
9. Pathophysiology, diagnosis, clinical manifestation and intensive care of collapse and syncope.

**Theme 10. Shock and Traumatic Injuries.**

1. Shock. Its definition and classification.
2. Pathophysiology, diagnosis, clinical manifestation and intensive care of haemorrhagic shock.
3. Pathophysiology, diagnosis, clinical manifestation and intensive care of traumatic shock.
4. Pathophysiology, diagnosis, clinical manifestation and intensive care of burn shock.
5. Pathophysiology, diagnosis, clinical manifestation and intensive care of anaphylactic shock.
6. Pathophysiology, diagnosis, clinical manifestation and intensive care of septic shock.
7. Infusion therapy and transfusion in treating different types of shock, infusion solutions.
8. Pathophysiology, diagnosis, clinical manifestation, intensive care and complications preventing in severe brain trauma.
9. Pathophysiology, diagnosis, clinical manifestation, intensive care and complications preventing in polytrauma.
10. Pathophysiology, diagnosis, clinical manifestation, intensive care and complications preventing in crash syndrome.
11. Pathophysiology, diagnosis, clinical manifestation, intensive care and complications preventing in electric shock.

**List of Practical Skills**

1. Airway management techniques.
2. Manual artificial ventilation.
3. Indirect heart massage by chest compressions.
4. Electrical defibrillation.
5. Mechanical ventilation using the Ambu bag and S-tube.
6. Methods of oxygen delivery.
7. Determination of the type and degree of respiratory failure.
8. Central venous pressure measurement.
9. Calculation of water balance and determining the degree of dehydration.
10. Calculation of deficiency of the main electrolytes.
11. Diagnosis of acid-base disorders. Calculation of infusion volume.
12. Methods of detoxication (gastric lavage, forced diuresis).
13. Evaluation of consciousness level.

14. Methods of mechanical ventilation of newborns and infants.
15. Chest compression technique used for newborns and infants.

## **QUESTIONS FOR THE FINAL CONTROL**

### **“Anesthesiology and Intensive Care”**

#### ***Part 1. Cardio-pulmonary resuscitation and Anesthesiology.***

1. Clinical death: signs and diagnostic criteria.
2. Basic Life Support.
3. Signs of effectiveness of CPR.
4. Advanced Life Support.
5. Cardiac Rhythms, associated with cardiac arrest. Checking rhythm.
6. Drugs in ALS: doses and administrations ways.
7. Defibrillation: methods, energy level, safety.
8. Indications for direct cardiac massage.
9. Complications during resuscitation.
10. Peri-arrest arrhythmias: ECG-signs and management/
11. Diagnosis of brain death.
12. Post-arrest management. 13. Intensive therapy of brain edema. 14. Classification of anesthesia. 15. Structure of anesthesia machine. 16. Safety in operating room.
17. Rebreathing and non-rebreathing systems, valves, absorbents.
18. Inhalation anesthetics: pharmacokinetics, clinical manifestation of anesthesia.
19. Components of general anesthesia.
20. Step-by-step in providing anesthesia.
21. Premedication: drugs, goal.
22. Preoperative evaluation of patients.
23. Stages of ether anesthesia by Guedel.
24. Inhalation anesthesia with spontaneous ventilation through the face mask.
25. Tracheal intubation in anesthesia: indications, methods, difficulties, complications.
26. Pharmacology of muscle relaxants.
27. Complications of general anesthesia.
28. Non-inhalation anesthetics: pharmacokinetics, clinical manifestations.
29. Methods of regional anesthesia.
30. Anesthesia in one-day surgery. Anesthesia in urgent surgery.
31. Pre-anesthesia management in surgical patient.
32. Pathophysiological peculiarities in providing anesthesia in older patients and children

#### ***Part 2. General Principles in Intensive care.***

1. The role of water and electrolytes in human body.
2. Osmolarity: violations and methods of correction.
3. Clinical signs of dehydration and hyperhydration.
4. Hypertonic dehydration: causes, signs, correction.
5. Isotonic dehydration: causes, signs, correction.
6. Hypotonic dehydration: causes, signs, correction.
7. Hypertonic hyperhydration: causes, signs, correction.
8. Isotonic hyperhydration: causes, signs, correction.
9. Hypotonic hyperhydration: causes, signs, correction.
10. Causes and signs of hyper- and hyponatremia, methods of treatment.
11. Pathophysiological changes in hypo- and hyperkalemia, clinical signs, diagnosis,

methods of correction.

12. Cl ion violation.
13. Buffer systems in human organism.
14. Acidosis: causes, diagnosis, correction.
15. Alkalosis: causes, diagnosis, correction.
16. Characteristics of fluids for infusion therapy.
17. Indications for parenteral nutrition.
18. Infusion therapy and correction of water-electrolyte and acid-base balance disorders in diabetes.
19. Infusion therapy and correction of water-electrolyte and acid-base balance disorders in postoperative period.
20. Infusion therapy and correction of water-electrolyte and acid-base balance disorders in pyloric stenosis.
21. Infusion therapy and correction of water-electrolyte and acid-base balance disorders in ileus.
22. Infusion therapy and correction of water-electrolyte and acid-base balance disorders in peritonitis.
23. Infusion therapy and correction of water-electrolyte and acid-base balance disorders in pancreatonecrosis.
24. Causes, pathogenesis of acute renal failure (ARF).
25. Differential diagnosis of prerenal, renal and postrenal oliguria and anuria. Laboratory dates in renal failure.
26. Stages of ARF.
27. General principles of treatment of ARF.
28. Uremic coma, intensive therapy.
29. Indications for hemodialysis.
30. Calculation of water balance in patients with ARF. Causes of acute hepatic failure (AHF).
31. Clinical manifestations and laboratory dates of AHF.
32. General principles of treatment of AHF.
33. Hepatic encephalopathy, intensive care.
34. Intensive care of acute poisoning.
35. Methods of forced diuresis.
36. Extracorporeal method of detoxification: indications, contraindications, techniques, apparatus.
37. Antidote therapy.
38. Pathogenesis, clinical signs and intensive care in methanol poisoning.
39. Pathogenesis, clinical signs and intensive care in ethanol and alcohol surrogate poisoning.
40. Pathogenesis, clinical signs and intensive care in opiate and barbiturate poisoning.
41. Pathogenesis, clinical signs and intensive care in organophosphorus poisoning.
42. Pathogenesis, clinical signs and intensive care in acid and alkaline poisoning.
43. Pathogenesis, clinical signs and intensive care in carbon monoxide poisoning.
44. Pathogenesis, clinical signs and intensive care in mushroom poisoning.
45. Emergency care in animal bite and sting.
46. Deviations of consciousness. Evaluation of conscious level.
47. Intensive care in comatose states.
48. Pathogenesis, clinical signs and intensive care in hypoglycemic coma.
49. Pathogenesis, clinical signs and intensive care in hyperglycemic coma.
50. Pathogenesis, clinical signs and intensive care in hyperosmotic coma.
51. Pathogenesis, clinical signs and intensive care in hyperthermia in children.

### ***Part 3. Intensive therapy in emergencies.***

1. Classification, clinical signs, differential diagnosis of hypoxia.
2. Hypercapnia, clinical signs.
3. Hypocapnia, clinical signs.
4. Classification of acute respiratory failure (AResF).
5. General principles of intensive care of AResF.
6. Oxygen therapy: methods, indications, toxicity of oxygen.
7. Artificial ventilation: methods, indications, criteria of effectiveness.
8. Methods of airway protection and improving the mucociliary function.
9. Suction from trachea, bronchi and pharynx. Intensive care in severe asthmatic attack.
10. Emergency care in pulmonary edema.
11. Aspiration syndrome, pathogenesis, clinical signs, intensive care.
12. Intensive care in postoperative acute respiratory failure.
13. Resuscitation and intensive care in drowning.
14. Respiratory distress syndrome in adults: etiology, pathogenesis, clinical signs and intensive care.
15. Resuscitation and intensive care in thromboembolism of pulmonary artery.
16. Circulation disorders types.
17. Pathogenesis, clinical signs and intensive care in acute cardiac failure.
18. Pathophysiology, clinical signs and intensive care in arrhythmias.
19. Pathophysiology, diagnostics, clinical signs and intensive care in collapse and syncope.
20. Pathogenesis, clinical signs and intensive care in traumatic shock.
21. Pathogenesis, clinical signs and intensive care in hemorrhagic shock.
22. Pathogenesis, clinical signs and intensive care in burn shock.
23. Pathogenesis, clinical signs and intensive care in anaphylactic shock.
24. Pathogenesis, clinical signs and intensive care in septic shock.
25. Resuscitation and intensive care in electric trauma.
26. Resuscitation and intensive care in crush-syndrome.
27. Resuscitation and intensive care in multiple traumas.

### **Forms of Control**

The forms of control and evaluation system are carried out in accordance with the requirements of the discipline program and the Instructions for evaluating the students' educational activity in the context of the implementation of the European Credit Transfer System for the organization of the educational process approved by Ukrainian Ministry of Health 15.04.2014. Current control is carried out in the course of studying a specific topic to determine the level of formation of individual skills or abilities, the quality of assimilation of a specific portion of the material. Final control - examination is carried out after the completion of the study of discipline in the IX semester.

Current control is carried out on each practical lesson according to the specific goals of each topic. In assessing the student's educational activity, it is necessary to give preference to standardized methods of control: testing, structured written work, structured according to the procedure for controlling practical skills in conditions that are close to real ones.

When assessing the mastering of each subject in the current educational activity, the student is awarded an assessment on the 4-point (traditional) scale, taking into account the approved evaluation criteria for the discipline concerned. It takes into account all types of works provided for by the curriculum. The student should get an assessment on each topic. Forms of assessment of the current academic activity should include the control of theoretical and practical training.

**Criteria for assessing student's current academic activity:**

Students' knowledge is assessed both from theoretical and practical training on the following criteria:

Excellent ("5") - Student answered correctly on 90-100% of tests in format A. Correctly, clearly, logically fully answers all standardized issues of the current topic, including issues of lecture course and independent work. Closely connects theory with practice and correctly performs practical work writing a conclusion on the results. Freely reads the results of laboratory studies, solves situational problems of increased complexity, is able to generalize material, possesses methods of laboratory research to the extent necessary.

Well ("4") - The student answered correctly on 70-89% of the tests of format A. Correctly and essentially corresponds to standardized questions of the current topic, lecture course and independent work. Demonstrates performance (knowledge) of practical skills. Correctly uses theoretical knowledge in solving practical problems. Is able to solve light and medium complexity situational tasks. Has the necessary practical skills and techniques and execution in a volume that exceeds the necessary minimum.

Satisfactory ("3") - The student correctly answered 50-69% of tests of format A.

Incomplete, with additional questions, answers to standardized issues of current topics, lectures and independent work. Can not independently build a clear, logical answer. When answering and demonstrating practical skills, the student makes mistakes. Student solves only the easiest tasks, has only a minimum of research methods

Failed ("2") - The student answered no less than 50% of the A format tests. Do not know the material of the current topic. Student can not construct a logical answer, does not answer the questions, does not understand the content of the material. During the response and demonstration of practical skills makes significant mistakes.

The maximum number of points that can be earned for the current semester for entry to the exam is 120 points. The minimum number of points that a student must score for the current study activity per semester for admission to the exam is 72 points.

The calculation of the number of points is based on the student's assessment of the traditional scale during the study of discipline, by calculating the average arithmetic, rounded to two decimals. The resulting value is converted to a score on a multi-score scale in the following way:

$$X = CA \times 120/5$$

### Recalculation the average score for current activity in a multi-score scale (final examination)

5	120	4.45	107	3.91	94	3.37	81
4.95	119	4.41	106	3.87	93	3.33	80
4.91	118	4.37	105	3.83	92	3.29	79
4.87	117	4.33	104	3.79	91	3.25	78
4.83	116	4.29	103	3.74	90	3.2	77
4.79	115	4.25	102	3.7	89	3.16	76
4.75	114	4.2	101	3.66	88	3.12	75
4.7	113	4.16	100	3.62	87	3.08	74
4.66	112	4.12	99	3.58	86	3.04	73
4.62	111	4.08	98	3.54	85	3	72
4.58	110	4.04	97	3.49	84	Менше 3	Недостатно
4.54	109	3.99	96	3.45	83		
4.5	108	3.95	95	3.41	82		

#### Assessment of independent work:

Assessment of students' independent work, which is envisaged in the topic along with classroom work, is carried out during the current control of the topic at the appropriate classroom session. The evaluation of topics that are made only for independent work and not included in the topics of classroom training is controlled by the final module control.

**Final control (differentiated assessment):**

Differentiated assessment is a form of final control of the student's assimilation of theoretical and practical material from the discipline "Anesthesiology and Intensive Care" for the semester, which is conducted as a control measure.

Students who have attended all classroom training sessions and have scored at least the minimum number of points (72 points) for the studied subjects are admitted to the final examination.

Differentiated assessment is conducted in written and oral form during the examination session, according to the schedule. The form of differential assessment is standardized and includes control of theoretical and practical training.

Regulation of differential assessment.

Differentiated assessment is carried out after the completion of study of all topics provided for in the program of the academic discipline, in the last control lesson in the discipline "Anesthesiology and intensive care".

Students who have attended all the classroom training sessions provided for by the program of the academic discipline and have scored at least 72 points on a 200-point scale according to the results of the current control are allowed to take a differentiated assessment.

Differentiated assessment is carried out in written form according to standardized versions of tasks compiled in accordance with the curriculum of the academic discipline. Differentiated assessment is conducted by a teacher assigned to the appropriate group of students.

Differentiated crediting includes:

40 test questions with one correct answer and 40 written multiple-choice questions. In extended-choice tasks, 50% of correct responses from the total number of distractors are assumed. Students must score between 50 and 80 points for differential credit. Practical skills are assessed by a teacher assigned to the appropriate group of students and assessed on a two-point scale: "passed" or "failed".

For disciplines, the form of final control is differentiated assessment:

The maximum number of points that a student can score for the current educational activity while studying the discipline is 120 points.

The minimum number of points that a student must score for the current educational activity to enroll in the discipline is 72 points.

The calculation of the number of points is carried out on the basis of the grades received by the student on a traditional scale during the study of the discipline during the semester, by calculating the arithmetic average (SA), rounded to two decimal places. The obtained value is converted into points on a multi-point scale as follows:

$$x = (CA \times 120) / 5$$

For convenience, a calculation table is given on a 200-point scale:

**Table 2 Recalculation of the average grade for the current activity into a multi-point scale for disciplines ending with an exam (differentiated grading)**

4- бальная шкала	200- бальная шкала	4- бальная шкала	200- бальная шкала	4- бальная шкала	200- бальная шкала	4- бальная шкала	200- бальная шкала
5	120	4.45	107	3.91	94	3.37	81
4.95	119	4.41	106	3.87	93	3.33	80
4.91	118	4.37	105	3.83	92	3.29	79
4.87	117	4.33	104	3.79	91	3.25	78
4.83	116	4.29	103	3.74	90	3.2	77
4.79	115	4.25	102	3.7	89	3.16	76
4.75	114	4.2	101	3.66	88	3.12	75
4.7	113	4.16	100	3.62	87	3.08	74
4.66	112	4.12	99	3.58	86	3.04	73
4.62	111	4.08	98	3.54	85	3	72
4.58	110	4.04	97	3.49	84	Менше 3	Недо- статньо
4.54	109	3.99	96	3.45	83		
4.5	108	3.95	95	3.41	82		

Score points for students who have successfully completed the program are converted into a traditional 4-point scale by the absolute criteria listed in the table.

Points	Score according to 4-score system
170-200	<b>5</b>
140-169	<b>4</b>
122 -139	<b>3</b>
Less than 122 points	<b>2</b>

### 10. Methodical support.

1. Educational-professional program of training specialist in the specialty 7.110101 "Therapeutic", direction of preparation 1101 "Medicine".
2. Educational and qualification characteristic of a specialist in the specialty 7.110101 "Medical business", direction of preparation 1101 "Medicine".
3. Recommendations on the development of educational curricula of educational disciplines (Order of the Ministry of Health of Ukraine dated October 12, 2004, No. 492).
4. Presidential Decree of 08.08.2000. 963/2000 "On additional measures for improvement of medical care to the population of Ukraine".
5. Methodological recommendations for teachers and students on each topic of practical classes.
6. Methodological recommendations for independent work of students.
7. Normal-methodical documents.
8. Visual materials, instructions for the use of technical means of training (devices and equipment)

### References

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3. Morgan & Mikhail's Clinical Anesthesiology. Butterworth J.E., Mackey D.C., Wasnick J.D. – McGraw Hill Education, 2013;
4. Intensive Care Medicine, 6<sup>th</sup> Edition. Irwin R.S., Rippe J.M. – Lippincott Williams & Wilkins. – 2008;
5. ICU Book, 3rd Edition. P. Marino. – Lippincott Williams & Wilkins. – 2007;
6. Clinical Anesthesia, 6<sup>th</sup> Edition. P.G.Barash, B.F.Cullen et al. – Lippincott Williams Wilkins. – 2009;
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