MEDICAL UNIVERSITY – PLOVDIV

FACULTY OF MEDICINE

SYLLABUS

IN

ANESTHESIOLOGY AND INTENSIVE CARE

Approved by the Department Council on 31/05/2022

Confirmed by the Faculty Council – Protocol №6/15.06.2022

Anesthesiology and intensive care

Syllabus

Discipline	Final exam/ semester	Auditorium classes				ECTS non-auditorium classes	ECTS total	Academic hours in years and semesters	
								4th year	
Anesthesiology and intensive care	VIII/IX	Total	Lectures	Practices	ECTS			VIII	IX
		60	30	30	2.0	1.0	3.0	2/2	2/2

DISCIPLINE:
Anesthesiology and intensive care

TYPE OF DISCIPLINE ACCORDING TO THE UNIFORM STATE REQUIREMENTS:
Obligatory

LEVEL OF QUALIFICATION:
Master **/M/**

FORMS OF TRAINING:
lectures, practical lessons, seminars, self- training

YEAR OF TRAINING:
IV / V

DURATION OF TRAINING:
one semester

ACADEMIC HOURS:
30 hours lectures, 30 hours practical lessons

TECHNICAL EQUIPMENT APPLIED IN THE TRAINING:
Multimedia presentations, discussions, case reports, seeing patients in the department, working with the mannequins for endotracheal intubation and CPR

FORMS OF EVALUATION:
- Current control (assessment during the practical lessons and colloquiums)
- Final exam (test, written, oral and practical exam)

EVALUATION CRITERIA:

The final mark in Anesthesiology and intensive care is multi-component and includes the marks from written, oral, practical exam and the mark from the current control. For each component involved in the formation of the final assessment, it is determined significant factor κ (from 0 to 1), the total sum of the factors of significance must always be 1. The final grade is obtained as a sum of the scores on the six-point system from the various components, multiplied by the respective coefficients of significance.

$$Q_{\text{final mark}} = k_1 Q_{\text{mark from the current control}} + k_2 Q_{\text{mark from the written exam}} + k_3 Q_{\text{mark from the oral exam}} + k_4 Q_{\text{mark from the practical exam}}$$

$$k_1 = 0.10;\ k_2 = 0.30;\ k_3 = 0.40;\ k_4 = 0.20$$

If one of the components of the final exam is failure (2), the final grade is obligatory failure (2).

ASPECTS OF EVALUATION CRITERIA:

• **Failure (2)** receives a student with scarce knowledge of the material, poor language culture, inability to reproduce the main points of the developed topic, necessary to cover the minimum required minimum in the discipline, inability to solve clinical cases and without their own clinical thinking; is not familiar with the basic terminology and has not mastered the mandatory professional competencies.

• **Average (3)** is given to a student who reproduces the knowledge in a "ready-made scheme", lacking the main points of the developed topic; there is no readiness for independent use of the acquired knowledge and professional competencies; the terminology is not mastered, the exposition is characterized by poor language;

• **Good (4)** is given to a student who develops the topic descriptively, reproductively, using typical situations; limited independence in using the acquired knowledge and acquired professional competencies; in the exposition, although there is a good language culture, inaccuracies in the concepts used are allowed;

• **Very good (5)** gets a student who develops the topic independently productively, non-standard, looking for a new algorithm and analysis of the used literature data; makes an attempt to derive and substantiate his thesis; adequately uses the concepts from the scientific field of the studied discipline, has a good language culture;

• **Excellent (6)** is awarded to a student who independently, logically, with the presence of a creative element brings out the topic; reasonably and originally uses and interprets the literature related to the revealed issue; there is a formation and readiness to use the acquired knowledge and professional competencies; demonstrates accurate and substantial vocabulary of the exposition.

SEMESTER EXAM:
Yes (theoretical – test, written, oral and practical)

STATE EXAM:
No

LECTURER:
Habilitated teacher from the Department of Anesthesiology, Emergency and Intensive Care Medicine

DEPARTMENT:
Anesthesiology, Emergency and Intensive Care Medicine

ANNOTATION

The education (theoretical and practical) in the field of Anesthesiology and intensive care is aimed at providing the students with fundamental knowledge in anesthesiology and intensive care, required in the complete preparation and establishment of the contemporary physician. The main purpose is to provide the knowledge and basic proficiency in the field of anesthesiology and intensive care for students in their fourth and fifths year, who in their upcoming practice will encounter and treat acute disturbances of the vital functions of the organism, as well as management of acute and chronic pain. In that sense special attention is given regarding the different types of anesthesia, medication and techniques for providing it and the different strategies in pain management. The accentuation in the intensive care section falls on the most common and significant critical conditions, resulting from the disturbances in vital functions of the organism, their etiology, pathogenetic mechanism, clinical presentation, the methods for monitoring vital signs and treatment strategies. The topics are based on pathology of the respiratory and cardiovascular system, as well as problems concerning fluid-electrolyte balance, acid-base balance and blood gases and their disturbances during anesthesia and different critical conditions. Attention has been given regarding specific peculiarities of different diseases of the central and peripheral nervous system, the management of patients with severe polytrauma, as well as nutritional and metabolic support during intensive care. The practical training is conducted according to the same plan in the operation theaters, at the bed of the patient in the department and on special training dummies.

BASIC AIMS OF THE DISCIPLINE

1. To familiarize the students with the most common and significant clinical syndromes, that arise from disturbances of the main vital function of the organism
2. To show the students the main methods of monitoring of vital functions, the information they present and the interpretation of the results
3. The establishment of clinical decision making, aimed at assessing the pathogenetic mechanisms of different critical condition and construction of a well-grounded and adequate diagnostic and treatment plan
4. To familiarize the students with the fundamental techniques of performing basic life support in patients with cardiac arrest
5. To familiarize the students with the main methods and means in conduction general and regional anesthesia during operative interventions and other invasive diagnostic and treatment procedures

EXPECTED RESULTS

1. To acquire the knowledge to recognize the main clinical symptoms and diagnostic criteria and the most common critical conditions, establishment of clinical diagnosis and draw up of an etiologically and pathogenetically proven diagnostic and treatment plan.
2. To acquire the skills and competence to conduct basic life support care during cardiopulmonary resuscitation in patients with cardiac arrest.
3. To acquire the knowledge and skills required for preoperative assessment of the health status and anesthesiologic risk and to conduct a plan regarding the preoperative preparation of patients that will undergo operative or other painful and invasive diagnostic and treatment procedures

Lectures

LECTURE № 1 – Introduction in anesthesiology and intensive care - 2 hours
Anesthesiology and intensive care as a science – topics and main tasks. Basic principles of reanimation and intensive care. Organization and structure of the intensive care unit. Indications and contraindications for intensive care. Critical condition concept. Practical aspects of diagnostic and treatment approach in critically ill patients. Monitoring in the ICU. Hemodynamic, respiratory, neurological and temperature monitoring.

LECTURE № 2 – Balance of the internal environment of the organism - Part I - 2 hours
Balance of the internal environment of the organism. Basic concepts - osmolarity, osmolality, tonicity. Distribution of body water in the compartments of the body. Fluid-electrolyte balance – disturbances of the metabolism of sodium, potassium, calcium, magnesium and phosphorus and their treatment.

LECTURE № 3 – Balance of the internal environment of the organism - II part - 2 hours

Acid-base balance. Basic concepts and definitions of acids and bases. Hydrogen exponent. Conjugated pairs and buffers. Definition, classification, mechanisms, criteria for diagnosis and treatment of acidosis. Definition, classification, mechanisms, criteria for diagnosis and treatment of alkalosis.

LECTURE № 4 – Acute respiratory failure - 2 hours

Acute respiratory failure - definition, classification, etiology, pathogenesis, clinical picture, diagnosis and monitoring, principles of treatment. Mechanical ventilation-basic principles. Acute respiratory distress syndrome in adults - definition, criteria for diagnosis, etiopathogenesis, clinical presentation and treatment.

LECTURE № 5 – Circulatory shock - 2 hours

Shock - definition, classification, etiology and pathogenesis. Clinical presentation. Criteria for diagnosis. Hemodynamic monitoring in shock patients. Basic principles of treatment. Purpose, tasks and means for treatment of circulatory shock. Principles of infusion, vasopressor and inotropic therapy

LECTURE № 6 – Sepsis and septic shock - 2 hours

Sepsis and septic shock. Basic concepts and definition. Etiology and pathogenesis. Classification. Rating scales. Clinical presentation. Diagnosis and monitoring. Basic principles of treatment.

LECTURE № 7 – Specifics of the intensive care for severe multiple trauma - 2 hours

Definition of multiple trauma (polytrauma). Mechanism of occurrence. Injury patterns. Strategy and phases of care. Trauma system components (ATLS). Patient triage. Assessment scoring of traumatic patients. Management of traumatically ill patients in the intensive care unit - phases. Damage control resuscitation - basic principles. Specifics of the intensive care in patients with severe chest, abdominal and pelvic injuries.

LECTURE № 8 – Acute disorders of the central nervous system - 2 hours

Intensive treatment in patients with acute disorders of the central nervous system - coma, severe traumatic brain injury, cerebrovascular disease. Rating scales. Brain death - definition, etiology and pathogenesis, criteria for diagnosis. Organ donation.

LECTURE № 9 – Nutritional and metabolic support in patients in intensive care - 2 hours

Malnutrition in critically ill patients - definition, pathogenesis, significance. Indications, contraindications and basic principles of nutritional and metabolic support in critically ill patients. Basic principles of parenteral, enteral and mixed nutrition - definition, indications, techniques, monitoring and complications.

LECTURE № 10 – Cardiopulmonary resuscitation - 2 hours

Clinical death and cardiac arrest - definition, terms, signs. Indications and contraindications for cardiopulmonary resuscitation. Basic and advanced life support - techniques for airway management, mechanical ventilation, extra-thoracic compression of the heart. Pharmacological treatment in cardiopulmonary resuscitation. Electrical therapy. CPR

algorithm in asystole, pulseless electrical activity, pulseless ventricular tachycardia, ventricular fibrillation. Postresuscitation syndrome treatment.

LECTURE № 11 – Fundamentals of contemporary anesthesiology - 2 hours
Essential goals and problems of contemporary anesthesiology. Types of anesthesia. Definition of general anesthesia. Types of general anesthesia. Effect of general anaesthetics on the CNS. Mechanism of general anesthesia. Stages of general anesthesia. Anesthesia workstation and delivery system.

LECTURE № 12 – Practical implementation of general anesthesia - 2 hours
Preoperative patient assessment and management. Anesthesia risk. Anesthesia plan and choice of anesthetic technique. Premedication. Practical conduct of general anesthesia. Induction of anesthesia - types, advantages and disadvantages. Maintenance of general anesthesia and patient monitoring. Emergence from general anesthesia - stages. Criteria for discharge from the operating room.

LECTURE №13 – General inhalational anesthesia – 2 hours
Definition of general inhalational anesthesia. Inhalation anaesthetic agents. Pharmacokinetics and pharmacodynamics of inhalation anaesthetics. Inhalational anesthesia techniques – facial mask and endotracheal intubation.

LECTURE №14 – General intravenous anesthesia – 2 hours
Definition. Intravenous anaesthetic agents. Pharmacokinetics and pharmacodynamics of intravenous anaesthetics. Intravenous anesthesia techniques. Physiology of neuromuscular transmission. Neuromuscular blocking agents – definition, classification and mechanisms of action. Indications and contraindications for application. Reversal of the neuromuscular blockade.

LECTURE №15 – Regional anesthesia – 2 hours
Regional anesthesia – definition and classification. Indications and contraindications. Pharmacology of the local anaesthetics. Local anesthetics systemic toxicity. Regional anesthesia techniques. Peripheral nerve blocks - brachial plexus block. Neuraxial anesthesia – definition, types, indications and contraindications, techniques and complications.

Practices

PRACTICAL №1 – Introduction to intensive care medicine – 2 hours
Organization and structure of the intensive care unit. Indications and contraindications for intensive care. Critical condition concept. Tissue oxygen delivery, oxygen requirements and oxygen consumption. Practical aspects of the diagnostic and treatment approach in critically ill patients. Monitoring in the ICU. Demonstration of monitoring equipment.

PRACTICAL №2 – Homeostasis – 2 hours
Management of patients with fluid and electrolyte and acid-base disorders. Demonstration of clinical cases.

PRACTICAL №3 – Acute respiratory failure – 2 hours
Practical aspects of the intensive care for patients with acute respiratory failure. Specifics of the diagnostic and treatment process. Practical conduct of mechanical ventilation –

indications, types, ventilation modes, monitoring and complications. Demonstration of clinical cases.

PRACTICAL №4 – Circulatory shock – 2 hours
Practical aspects of the intensive care for patients with circulatory shock. Specifics of the diagnostic and treatment process in hypovolemic, cardiogenic, obstructive and distributive shock. Basics principles of the fluid infusions, vasopressors and inotropes application in the clinical practice. Demonstration of clinical cases.

PRACTICAL №5 – Sepsis and septic shock – 2 hours
Practical aspects of the intensive care for patients with sepsis and septic shock. Specifics of the diagnostic and treatment process. Contemporary challenges in the antimicrobial, hemodynamic, immunomodulatory and supportive therapy. Demonstration of clinical cases.

PRACTICAL №6 – Severe multiple trauma (Polytrauma) – 2 hours
Practical aspects of the intensive care for patients with polytrauma. Stages and phases of care. Components of trauma system (ATLS). Patient triage. Management of the traumatically ill patients in the intensive care units – phases. Specifics of the diagnostic and treatment process in severe thoracic, abdominal and pelvic injuries. Demonstration of clinical cases.

PRACTICAL №7 – Acute disorders of CNS – 2 hours
Practical aspects of the intensive care for patients with acute CNS disorders. Specifics of the diagnostic and treatment process in coma, traumatic brain injuries and cerebrovascular accidents. Management of intracranial hypertension – basic principles. Brain death. Intensive care for organ and tissue donors. Demonstration of clinical cases.

PRACTICAL № 8 – Nutritional and metabolic support in the critically ill patient – 2 hours
Nutritional support in the intensive care unit. Malnutrition – practical considerations for the diagnosis and treatment. Basics of enteral, parenteral and combined nutrition – indications, contraindications, techniques, formulas, monitoring, complications. Clinical case demonstrations.

PRACTICAL № 9 – Basic principles of cardiopulmonary resuscitation – 2 hours
Clinical death, cardiac arrest – definition, signs, symptoms, time limits. Indications and contraindications for cardiopulmonary resuscitation. Basic and advanced life support – techniques for airway management, mechanical ventilation and extra thoracic compressions of the heart. Pharmacological treatment in cardiopulmonary resuscitation. Electrical therapy. CPR algorithm in asystole, pulseless electrical activity, pulseless ventricular tachycardia, ventricular fibrillation. Post resuscitation syndrome treatment.

TEST - "INTENSIVE CARE"

PRACTICAL № 10 – Introduction to Anesthesiology – 2 hours
Definitions of anesthesia. Types of anesthesia. General anesthesia – definition, components, classification. Stages of general anesthesia. The anesthesia workstation – basic components. Anesthesia breathing systems.

PRACTICAL № 11 – Practical considerations for performing general anesthesia (1st part) – 2 hours

Stages of planning and performing general anesthesia. Preoperative patient assessment and management. Preoperative anesthetic risk assessment. Anesthesia plan and choice of anesthetic technique. Premedication – definition, goal, types, drugs. Preoperative evaluation and preparation for patients with co-existing diseases. Anesthetic management of patients with full stomach. Clinical case demonstrations.

PRACTICAL № 12 – Practical considerations for performing general anesthesia (2nd part) – 2 hours

Induction of general anesthesia. Demonstration of different induction techniques. Maintenance of general anesthesia and patient monitoring. General anesthetics – pharmacological essentials. Emergence from general anesthesia – stages, criteria. Practical assessment of patient readiness for discharge from the operating room. Clinical case demonstrations.

PRACTICAL № 13 – Airway management in anesthesia and intensive care – 2 hours

Basic techniques and equipment for airway management in anesthesia and intensive care. Face mask ventilation – techniques, indications, contraindications. Laryngeal mask – definitions, types, techniques for insertion, advantages, disadvantages, indications, contraindications. Endotracheal intubation – indications, techniques, equipment. Practical aspects of the endotracheal intubation anesthesia. Clinical case demonstrations.

PRACTICAL № 14 – Regional anesthesia – 2 hours

Practical aspects of performing regional anesthesia – definitions, indications, contraindications, preanesthetic evaluation and patient preparation. Local anesthetics – pharmacological essentials. Practical aspects of performing spinal and epidural anesthesia – definition, indications, contraindications, preparation, techniques. Peripheral nerve blocks – performance technique of axillary brachial plexus block. Complications of peripheral and central nerve blocks – prevention and treatment.

PRACTICAL № 15 – Anesthesia in different surgical specialties – 2 hours

Practical aspects of anesthesia in different surgical specialties – abdominal surgery, thoracic surgery, neurosurgery, ophthalmology, ENT, orthopedic and trauma surgery, obstetrics and gynecology. Ambulatory anesthesia. Anesthesia in invasive diagnostic and therapeutic procedures. Clinical case demonstrations.

TEST – "ANESTHESIOLOGY"

Bibliography

Textbooks:

1. Sikka P., Beaman Sh., Street A. Basic Clinical Anesthesia. Springer, 2015. ISBN: 1493917366
2. Barash P., Cullen B., Stoelting R. Clinical Anesthesia Fundamentals, 1st ed. LWW, 2015. ISBN: 978-1451194371
3. Pardo M., Miller R. Basics of Anesthesia, 7th ed. Elsevier, 2017. ISBN: 978-0323401159
4. Butterworth J., Mackey D., Wasnick J. Morgan and Mikhail's Clinical Anesthesiology, 6th ed. McGraw-Hill Education, 2018. ISBN: 978-1259834424

5. Marino P. Marino's ICU Book, 4th ed. LWW, 2013. ISBN: 978-1451121186
6. Parrillo, Joseph E., Dellinger, R. Phillip. Critical Care Medicine: Principles of Diagnosis and Management in the Adult, 5th ed. Elsevier, 2019. ISBN: 978-0323446761
7. Mitchell P. Fink, Jean-Louis Vincent, Frederick A. Moore. Textbook of Critical Care 7th ed. Elsevier, 2017. ISBN: 978-0323376389

Handbooks:

1. Keith Allman, Iain Wilson, and Aidan O'Donnell. Oxford Handbook of Anaesthesia, 4th ed. Oxford University Press, 2016. ISBN: 978-0198719410
2. Mervyn Singer, Andrew Webb. Oxford Handbook of Critical CareAnaesthesia, 3rd ed. Oxford University Press, 2009. ISBN: 978- 0199235339

Conspectus

1. Anesthesiology and intensive care as a science – basic principles, essential problems and tasks. Basic tasks of the anesthesiologist in the OR.
2. Hemodynamic, respiratory, neurological and temperature monitoring in OR and ICU.
3. Tissue oxygen delivery, oxygen requirements and oxygen consumption. Critical condition concept. Indications and contraindications for intensive care.
4. Definition of anesthesia. Classification. General anesthesia – definition, components, types. Mechanism of general anesthesia. Stages of general anesthesia. Effects of the general anesthetic on the central nervous system.
5. Anesthesia workstation and anesthesia breathing systems – basic components.
6. Preoperative patient assessment and management. Preoperative anesthesia risk assessment. Anesthesia plan and choice of anesthetic technique.
7. Preoperative patient assessment and management. Premedication – definition, types, goals, pharmacological agents.
8. Preoperative evaluation and preparation for patients with co-existing diseases – ischemic heart disease, valvular heart diseases, arterial hypertension, coagulation disorders, COPD, diabetes mellitus.
9. Anesthetic management of patients with "full stomach". Aspiration syndrome.
10. Definition of general inhalational anesthesia. Inhalation anesthetic agents - anesthetic gases and volatile anesthetics. Pharmacokinetics and pharmacodynamics of the contemporary inhalational anesthetics- nitrous oxide, isoflurane, sevoflurane, desflurane.
11. Inhalational anesthesia techniques. Face mask general anesthesia – techniques, indications, contraindications. Endotracheal anesthesia – indications, techniques, equipment and pharmacologic agents.
12. Physiology of neuromuscular transmission. Neuromuscular blocking agents – definition, classification and mechanisms of action. Reversal of the neuromuscular blockade.
13. Induction of general anesthesia - definition, techniques, pharmacological agents., advantages and disadvantages.

14. Maintenance of general anesthesia and patient monitoring.
15. Emergence from general anesthesia - phases. Criteria for discharge from the OR.
16. Basic techniques and equipment for airway management. Management of difficult airways. Mechanical ventilation-basic principles, types, indications, monitoring and complications.
17. Intravenous Anesthesia - definition. Advantages and disadvantages. Intravenous anesthetics. Pharmacokinetics and pharmacodynamics of intravenous anesthetics. Intravenous anesthesia techniques. Modern multicomponent balanced intravenous anesthesia.
18. Locoregional anesthesia – definition, classification, indications and contraindications. Pharmacology of the local anesthetics – classification, pharmacodynamics and pharmacokinetics. Systemic toxicity of the local anesthetics – clinical picture, treatment.
19. Epidural and spinal anesthesia – definition, comparative characteristics, advantages and disadvantages. Indications and contraindications. Performance technique. Complications – prophylaxis and treatment.
20. Locoregional anesthesia. Peripheral nerve blocks. Upper extremity nerve blocks – performance technique of axillary brachial plexus nerve block. Complications of peripheral nerve blocks – prophylaxis and treatment.
21. Ambulatory anesthesia – characteristics, special requirements, choice of anesthetic agents and techniques. Criteria for discharge. Anesthesia for invasive diagnostic and therapeutic procedures.
22. Balance of the internal environment of the organism. Fluid-electrolyte balance. Basic concepts - osmolarity, osmolality, tonicity. Distribution of body water in the compartments of the body.
23. Disturbances of the metabolism of sodium, potassium, calcium, magnesium and phosphorus and their treatment.
24. Acid-base balance. Basic concepts and definitions of acids and bases. Hydrogen exponent. Conjugated pairs and buffers.
25. Definition, classification, mechanisms, criteria for diagnosis and treatment of acidosis.
26. Definition, classification, mechanisms, criteria for diagnosis and treatment of alkalosis.
27. Nutritional and metabolic support in the critically ill patients. Malnutrition in critically ill - definition, pathogenesis, significance, diagnosis and treatment.
28. Basic principles of nutritional and metabolic support in critically ill patients. Parenteral, enteral and mixed nutrition - definition, indications, contraindications, techniques, formulas, monitoring and complications.
29. Circulatory shock - definition, classification, etiology and pathogenesis, stages of evolution, clinical presentation, criteria for diagnosis - hypovolemic, cardiogenic, obstructive and distributive shock.
30. Circulatory shock – principles of treatment. Purpose, tasks and means of treatment of circulatory shock. Principles of fluid infusion, vasopressor and inotropic therapy.
31. Hemorrhagic shock – definition, etiology, pathogenesis, clinical presentation, patient monitoring, principles of treatment.
32. Transfusion therapy - indications, risks and iatrogenic events.
33. Cardiogenic shock – definition, etiology, pathogenesis, clinical presentation, patient monitoring, principles of treatment.
34. Sepsis and Septic Shock. Basic concepts and definition. Multiple-Organ Failure Syndrome Classification. Etiology and pathogenesis. Rating scales. Diagnostic criteria. Clinical presentation, patient monitoring.

35. Sepsis and Septic Shock- principles of treatment.
36. Acute respiratory failure - definition, classification, etiology, pathogenesis, clinical picture, diagnosis and monitoring, principles of treatment.
37. Acute Respiratory Distress Syndrome in adults (ARDS) - definition, etiology, pathogenesis, phases of evolution, criteria for diagnosis, patient monitoring, clinical presentation and treatment.
38. Multiple trauma – definition, pathogenesis, strategies and phases of treatment. Principles of prehospital and advanced trauma life support (ATLS). Triage. Damage control resuscitation – basic principles.
39. Chest trauma – classification, pathogenesis, initial assessment and resuscitation. Diagnosis and treatment of life-threatening complications – tension pneumothorax, open pneumothorax, cardiac tamponade, massive hemothorax, flail chest.
40. Severe Traumatic Brain Injury – definition, etiology, pathogenesis, assessment scales, patient monitoring. Treatment - basic principles of management of intracranial hypertension.
41. Preeclampsia and eclampsia – etiology, pathogenesis and treatment.
42. Acute kidney injury – definition, classification, etiology, pathogenesis, diagnostic criteria, principles of treatment.
43. Acute liver failure – definition, classification, etiology, pathogenesis, diagnostic criteria, principles of treatment.
44. Acute CNS disorders. Specifics of the diagnostic and treatment process in coma, traumatic brain injuries and cerebrovascular accidents. Management of intracranial hypertension – basic principles. Brain death. Intensive care for organ and tissue donors.
45. Clinical death, cardiac arrest – definition, signs, symptoms, time limits. Indications and contraindications for cardiopulmonary resuscitation. Basic and advanced life support – techniques for airway management, mechanical ventilation and extra thoracic compressions of the heart.
46. CPR algorithm in asystole, pulseless electrical activity, pulseless ventricular tachycardia, ventricular fibrillation
47. Pharmacological treatment in cardiopulmonary resuscitation. Electrical therapy. Post resuscitation syndrome treatment.