



APPROVED  
EMD decision

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Protocol No. \_\_\_\_\_  
Chairman of the EMC Vice-Rector,  
candidate of pedagogical sciences,  
associate professor Apezoza D.U.



## SYLLABUS by discipline

### B.3.4.8. ANESTHESIOLOGY, INTENSIVE CARE, EMERGENCY CONDITIONS

For students of the educational program, higher professional education in the specialty 560001 "General Medicine" (5-year education) in the specialty "Doctor"

Type of study work	Total hours
course	5
Semester	10
Number of weeks	18
Credits	3
The total complexity of the discipline	90
Classroom/practical studies (PS)	54
Student Independent Work (SIW)	36
Forms of control	
current control	Testing, oral questioning, written test
Frontier control	Testing
Midterm	Testing
Final control	exam
Semester rating by discipline:	Point-rating system

### Information about the teacher of the academic discipline

Full Name	Hojahunov Bahtier Raimjanovich
Job title	Teacher
Academic degree	
Academic title	
Email address	
Location of the department (address)	KR, Bishkek, st. Shabdan Baatyr 128, floor 2
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Consultation hours	11.00-13.30

### Characteristics of the academic discipline

*The purpose of studying* the discipline The purpose of mastering the discipline "Anesthesiology and resuscitation" is the formation and development of competencies in the field of: modern general and regional anesthesia, and their principles in general surgery; modern methods of analgesic therapy; clinical physiology and pathogenesis of acute disorders of the main functions of vital organs and systems, as well as methods of clinical and laboratory evaluation their severity; intensive therapy of these disorders; cardiopulmonary resuscitation in case of sudden death. Knowledge and understanding of the basics of physiology, pathophysiology, propaedeutics of internal diseases, pharmacology, therapy and surgery is

mandatory, which will allow students to gain deeper knowledge of anesthesiology, resuscitation and intensive care. In turn, knowledge of the basic methods of resuscitation, intensive care and anesthesiological aids can significantly improve the effectiveness of treatment of severe patients and victims in emergency conditions. The purpose of mastering the discipline "Anesthesiology, intensive care, emergency conditions" is to provide students with systematic theoretical and applied knowledge about the nature of violations of vital functions of the patient's body, methods of first aid in emergency conditions, means, principles of intensive care and resuscitation, as well as the development of skills to apply the knowledge gained in practice. While studying the course, students get acquainted with the principles of anesthesiological provision of surgical interventions and methods of analgesic therapy; a system of knowledge about the etiology and pathogenesis of critical conditions, the pathophysiological essence of the processes occurring during the death and recovery of the body is being formed; a system of knowledge on the diagnosis and principles of treatment of critical conditions in patients with surgical, therapeutic and other profiles; skills, skills and competencies of a qualified approach to patients with disorders of vital body functions are being developed. During the training, students also develop the skills of providing first and emergency care in critical conditions in patients with therapeutic, surgical and other profiles; the skills of conducting a complex of resuscitation measures in acute respiratory and circulatory disorders, in clinical death. By the end of studying the discipline, students should apply modern methods of resuscitation and intensive care in providing assistance to patients and victims in critical conditions of various etiologies; the simplest methods of anesthesia when performing painful procedures and interventions, when relieving pain syndromes; to form a stable algorithm for cardiopulmonary and cerebral resuscitation; ideas about the principles of organization and capabilities of modern specialized anesthesiological resuscitation services; modern methods of monitoring and detoxification used in intensive care.

#### Prerequisites of the discipline:

- Normal anatomy
- General clinical biochemistry
- Histology, Embryology, cytology
- Normal physiology
- Microbiology, Virology and Immunology
- Pathological anatomy
- Pathological physiology
- Basic pharmacology

**There are no post- requisites for this discipline.**

#### The results of teaching the discipline according to the RO GEP

The study of the discipline of microbiology, virology and immunology will contribute to the achievement of learning outcomes (RE) GEP:

**RE-8** - Interpret, analyze and evaluate data from clinical, laboratory and instrumental diagnostic methods, make a treatment plan, including emergency care, taking into account urgent and priority signs of the disease.

**RE-13** - To demonstrate honesty and decency in relations with patients and their families and colleagues, observing medical secrecy and confidentiality in their professional life.

Within the framework of this discipline, the following results of discipline training are expected to be achieved, which are implemented within the framework of achieving competencies:

**PC-16** - is able and ready to use the algorithm for diagnosis (main, concomitant, complications) taking into account ICD, perform basic diagnostic measures to identify urgent and life-threatening conditions;

**PC-19** - is capable and ready to provide first aid in case of emergency and life-threatening conditions, to refer patients to hospitalization, in a planned and emergency manner;

#### Content of the discipline

№№	Name of topics
1.	Section 1. ANESTHESIOLOGY.
2.	ANESTHESIOLOGY.GENERAL QUESTIONS
3.	"Anesthesiology, resuscitation and intensive care", in the system of medical knowledge and its role in modern clinical medicine. Regulation of the activities of the anesthesiology and Resuscitation Service.
4.	The main stages of the development of anesthesiology, intensive care and intensive care. Ethical and legal aspects of the specialty

5.	Fundamentals of modern anesthesiology. Anesthesiological manual, classification of modern methods. Components and stages of general anesthesia. Clinical pharmacology of drugs for anesthesia. Anesthesia and respiratory equipment and monitoring. Rules for working with compressed gases.
6.	Cellular and molecular mechanisms of anesthesia. Special methods of anesthesia (artificial hypothermia).
7.	Physiology of pain, peripheral and central mechanisms of pain. Nociception and antinociception. Neurotransmitters. Pathophysiology of pain syndrome. Classification of pain syndromes. Pain syndrome treatment: multimodal analgesia, proactive analgesia, patient-controlled anesthesia. Clinical pharmacology of drugs for the treatment of pain syndromes.
8.	Melzak's "entrance gate" theory. Clinical physiology and intensive therapy of the early postoperative period.
9.	Section 2. RESUSCITATION
10.	INTENSIVE CARE. GENERAL QUESTIONS
11.	Fundamentals of modern resuscitation. Terminal state. Types of cardiac arrest. Clinical death, biological death. A disease of a lively organism.
12.	Complex resuscitation methods: basic complex – BLS (Basic life support) and advanced complex - ALS (Advanced life support). The algorithm of conducting. Performance criteria. Possible complications, their prevention and treatment. Indications for termination of resuscitation measures.
13.	Prevention and treatment of posthypoxic brain damage. Questions of deontology at the termination of resuscitation. Ethical and socio-legal problems associated with the termination of resuscitation.
14.	Section 3. INTENSIVE CARE
15.	ACUTE CIRCULATORY FAILURE (SHOCK)
16.	Acute circulatory insufficiency (disorder) – shock. Hypovolemic shock. Vasogenic (distributive) shock: anaphylactic, septic and neurogenic. Cardiogenic shock. Pathophysiology, diagnosis and differential diagnosis. Components of intensive therapy: infusion, vasoactive, inotropic, respiratory and antibacterial, extracorporeal membrane oxygenation, balloon counterpulsation and balloon abdominal aorta, auxiliary blood circulation.
17.	Parameters of central hemodynamics, invasive and non-invasive monitoring. Multiple organ failure in shock.
18.	ACUTE RESPIRATORY FAILURE
19.	Acute respiratory failure (ODN). Definition, etiology, pathophysiology, classifications, clinical and morphological characteristics, functional tests, indicators of blood gas composition. Diagnostic criteria. Basic principles of treatment. IT is used for asthmatic status, massive pneumonia, adult respiratory distress syndrome, acid aspiration pneumonitis (Mendelssohn syndrome). Artificial lung ventilation (ventilator), indications, modes of conducting.
20.	Respiratory therapy, calculation of the main parameters of the ventilator. Exogenous surfactant therapy for adult respiratory distress syndrome. Hyperbaric oxygenation
21.	ACUTE CEREBRAL INSUFFICIENCY. COMATOSE STATE
22.	Acute cerebral insufficiency. Comatose state. Edema -swelling and dislocation syndrome of the brain substance. Clinical signs, diagnostic criteria, differential diagnosis of comatose states. Pathological syndromes of comatose states. Diagnostic criteria, scales. Pathological syndromes of comatose states. Basic principles of treatment of acute cerebral insufficiency.
23.	Methods of monitoring vital functions in comatose states. Interpretation of changes.
24.	ACUTE HEPATIC AND RENAL INSUFFICIENCY.
25.	Acute liver failure Definition. Etiology of acute liver failure, groups of main causes: fulminant and subfulminant hepatitis; unfavorable course of chronic hepatitis and cirrhosis of the liver; prolonged and severe cholestasis; liver necrosis or tumor destruction of the organ; hypoxia of the liver parenchyma. Risk factors (provoking factors). Pathogenetic links of acute liver failure. Clinical and morphological forms: the main clinical syndromes (cholestasis, hepatocytolysis, hepatic encephalopathy, hemorrhage, portal hypertension, inflammatory mesenchymal syndrome, hepatolienal and hepatorenal syndrome) and their various combinations. Diagnostics. Current, forecast. Prevention. Principles of OPeN treatment: basic (normalization of the main vital processes), specific (substitution therapy, methods of active detoxification).

26.	Classification of hepatic insufficiency (Conn, Lakhin. Child - Pugh, etc.). The importance of stress tests and liver biopsy in diagnosis. New technologies in diagnostics. Extracorporeal detoxification methods and liver transplantation
27.	Acute renal failure. Definition. Etiology of various morphological variants of acute renal failure: prerenal, renal and postrenal factors. The main links in the pathogenesis of acute renal failure. Risk factors. Classification. Stages and clinical manifestations of OPN. Laboratory and instrumental research methods. Qualitative and quantitative methods of urine examination. Diagnosis criteria. Course. Issue. Forecast. The basic principles of intensive care and resuscitation. Measures for the prevention of acute renal failure. Absolute indications for renal replacement therapy.
28.	Anatomy and physiology of the urinary system (mechanism of urination, autoregulation). Etiopathogenetic, anti-inflammatory, symptomatic, nephroprotective therapy. Criteria for recovery in acute kidney injury.
29.	ACID-BASE STATE. BLOOD AND HEMOSTASIS SYSTEM. WATER-ELECTROLYTE BALANCE.
30.	Acid-base state (CBS). The concept, physiological principles of regulation of acid-base state. Indicators of acid-base state (CBS). The role of the lungs and kidneys in the regulation of CBS. Etiology and pathogenesis of CBS disorders. Types of violations. Methods of laboratory diagnostics and control of the main types of acid-base state disorders. Methods of correction of BRAID shifts.
31.	P. Stewart's theory. The importance of CBS in the regulation of hemostasis. The relationship of shifts (disturbances) of the acid-base state and the water-electrolyte balance.
32.	Blood and hemostasis system. Morphofunctional and electrophysiological properties of peripheral blood cells. Group antigens of human red blood cells (ABO system). Rhesus antigen system (RhO). The importance of platelet and leukocyte antigens in transfusiology. Methods and techniques for determining blood type and Rh factor, conducting blood compatibility tests of the donor and recipient. Errors in determining blood groups and performing blood transfusion. Physiology and mechanisms of regulation of the hemostasis system (vascular-platelet hemostasis, plasma factors). Methods of laboratory examination of components of the hemostasis system. The main clinical types of hemostasis disorders are: DIC, PE, hereditary coagulopathy and thrombocytopeny. Diagnosis and correction of hyper- and hypocoagulation syndromes. Characteristics of drugs, indications for use. Basic principles of intensive care.
33.	Minor antigens of human erythrocytes. The modern concept of compatibility of donor and recipient blood. Cellular concept of regulation of the hemostasis system. Laboratory express diagnostics of blood parameters.
34.	Water-electrolyte balance (exchange) - WEB. Water sectors of the body: volume and ionic composition. Physiological criteria. Regulation of the water-electrolyte balance. The concept of osmolarity (osmolality). Indicators of the electrolyte composition of the blood. Pathological loss of fluid and electrolytes. Diagnostics of the main types of violations of the water - electrolyte balance. Prevention and Basic principles of correction of disorders of the water-electrolyte balance, taking into account the relationship of violations of EBV KOS and the hemostasis system. Preparations for the correction of disorders of the water-electrolyte balance.
35.	Assessment of the dynamics of central venous pressure (CVP), hourly and daily diuresis, hemodynamic parameters in EBV disorders. The concept of isoosmolarity and isoneutrality.
36.	INFUSION -TRANSFUSION THERAPY. NUTRITIONAL SUPPORT.
37.	Infusion - transfusion therapy (ITT). Definition of the concept of ITT. The main provisions of transfusiology. Fundamentals of ITT: assessment of volemic status, indications for ITT. Principles of infusion therapy: basic and corrective ITT. Special methods of infusion therapy (detoxification, rehydration, dehydration, etc.). The main infusion - transfusion media: balanced crystalloids, colloidal and combined solutions. Crystal-like solutions: electrolyte (balanced) and non-electrolyte solutions. Heterogeneous plasma-substituting colloidal solutions: solutions of dextrans, gelatin, dioxethyl starch. Autogenic colloidal solutions: albumin, protein, plasma, erythrocyte mass, other blood products. Methods of conducting and methods of monitoring the adequacy of infusion - transfusion therapy. Complications of infusion-transfusion therapy, their prevention and treatment
38.	The technique of catheterization of the main and peripheral veins. Preparation of infusion programs taking into account the needs of the patient in water, electrolytes, the degree of dehydration and deficiency of BCC, the age and weight of the patient using the simplest formulas. Indications for blood transfusion and its components. Protocols.

39.	Nutritional Support (NP). Nutritional status. Protein metabolism (trophic status), energy balance (energy demand, calculation equations). Nutritional (protein -energy) deficiency (deficiency or imbalance). The modern concept of NP: providing energy and plastic needs. Determination of the degree of nutritional insufficiency. Indications and contraindications to NP. Basic principles and options for nutritional support. Methods and techniques of nutritional support. Features of NP in various types of organ dysfunction. Metabolic monitoring and evaluation of the effectiveness of NP. Complications. Prevention and treatment. Characteristics of pharmaconutrients (drugs used for parenteral and enteral nutrition).
40.	Enteral (intestinal) insufficiency syndrome (SEN). Protocol for prescribing medications for nutritional support. Three-component parenteral nutrition with the addition (if necessary) of multivitamin complexes, electrolytes and trace elements.
41.	Acute exogenous poisoning. Definition. Classification of acute exogenous poisoning. Ways of getting toxic substances into the body. Pathophysiology. Clinical syndromes that occur in acute poisoning. Exotoxic shock. Differential diagnosis of symptoms and syndromes of acute poisoning from cerebral and other organ disorders of other etiology. Sampling of biological material (gastric lavage, vomit, urine, blood) for chemical and toxicological examination. The basic principles of complex treatment of acute poisoning: restriction and cessation of poison intake; incorporeal detoxification (removal of non-absorbed poison, removal of absorbed poison); extracorporeal detoxification (hemosorption, plasmosorption, lymphosorption, plasmapheresis, etc.; antidote (specific) therapy
42.	Rapid screening tests. Features of intensive care and resuscitation for the most common poisoning and poisoning with unknown poisons (poisoning with alcohol and its surrogates, sleeping pills and sedatives, FOS, chlorinated hydrocarbons, cauterizing fluids, carbon monoxide, mushrooms, bite of poisonous snakes, insects).
43.	Electro-pulse therapy: defibrillation, cardioversion, electrocardiostimulation. Acute Cerebrovascular accident: ischemic and hemorrhagic types. Etiology. Pathogenesis. Classification. Clinical course. Complications of IT features.
44.	Accidents. - Drowning in salt and fresh water. Pathophysiology. Clinical syndromes. Complications. Features of intensive care and intensive care. - Electrical injury. Pathophysiology. Clinical syndromes. Complications. Features of intensive care and intensive care. - Overheating: heat and sunstroke. Pathophysiology. Clinical syndromes. Complications. Features of intensive care and intensive care. - Cold injury: hypothermia, cold injury. Pathophysiology. Clinical syndromes. Complications. Features of intensive care and intensive care. - Prolonged compression syndrome. Pathophysiology. Clinical syndromes. Complications. Features of intensive care and intensive care. - Strangulation asphyxia. Pathophysiology. Clinical syndromes. Complications. Features of intensive care and intensive care.
45.	Hyperthermic syndrome. Etiology. Pathogenesis. Clinical course. Complications of IT features.

### **List of main and additional literature:**

#### **Main literature:**

1. Obstetric Anesthesia. A Case – Based and Approach. Thomas L. Archer Editor, Foreword by Jonathan L. Benumof, 2018
2. Bagnenko S.F., Emergency medical care: national guidelines / edited by S.F. Bagnenko, M.S. Khubutia, A.G. Miroshnichenko, I.P. Minnullina. - M.: GEOTAR-Media, 2018

#### **Additional literature:**

1. Bunyatyan A.A., Anesthesiology: National Guidelines / edited by A.A. Bunyatyan, V.M. Mizikov - M.: GEOTAR-Media, 2017
2. Anesthesiology-resuscitation: clinical recommendations / edited by I. B. Zabolotskikh, E. M. Shifman; Federation of Anesthesiologists and Resuscitators. - Moscow: GEOTAR-Media, 2016.
3. Carl L. Gwinnut Clinical anesthesia Carl L. Gwinnut— M.: BINOM. Laboratory of Knowledge, 2
4. Anesthesia and pain control. / edited by V.S. Savelyev, A.I. Kiriyeenko - M.: GEOTAR-Media, 2016.

#### **Internet resources:**

<http://www.studmedlib.ru/>  
<https://www.iprbookshop.ru/>  
<http://elibrary.ru>  
<http://www.edu.ru>

## Monitoring and evaluation of learning outcomes

### The content of the rating system for assessing student performance

The rating assessment of students' knowledge in each academic discipline, regardless of its total labor intensity, is determined on a 100 (one hundred) - point scale and includes current, boundary, intermediate and final control.

The distribution of rating scores between types of control is established in the following ratio (according to the table of the score-rating system of assessments):

Form of control				
current (CC)*	boundary control (BC)**	mid-term exams (MC)***	Final /exam (FE)	Discipline Rating (RD)
0-100 points	0-100 points	0-100 points	0-100 points	0-100 points, with the translation of points into a letter designation

Note:

\*  $TK(middle) = \frac{\sum_1^n \times point}{\sum_1^n}$ , where n is the number of types of classroom and extracurricular work of students in the discipline;

\*\*  $PK(middle) = \frac{\sum_1^n credit \times point}{\sum_1^n credits}$ , where n is the number of modules (credits) in the discipline;

\*\*\*  $ПК(middle) = \frac{\sum_1^n \times point}{\sum_1^n}$ , where n is the number of intermediate controls (2 controls per semester: in the middle and at the end of the semester) by discipline;

\*\*\*\* ИК – examination conducted at the end of the study of the discipline

;

\*\*\*\*\*  $РД = \frac{TK_{cp} + PK_{cp} + ПК_{cp} + ИК}{4}$ , the final rating of the results of all types of control at the end of the discipline;

GPA =  $\frac{\sum_1^n \times балл}{\sum_1^n}$  where, n is the number of disciplines in the semester (for the past period of study).

A student who has not passed the current, boundary and intermediate controls to the final control (exam) is not allowed.

**The current control** is carried out during the period of classroom and independent work of the student on time according to the schedule, at the end of the study of the discipline, the average score of the current control (CC) is calculated. *Forms of current control can be:*

- testing (written or computerized);
- performance of individual homework assignments, abstracts and essays;
- student's work in practical (seminar) classes;
- various types of colloquia (oral, written, combined, express, etc.);
- control of performance and verification of reporting on laboratory work;
- visiting lectures and practical (seminar, laboratory) classes;
- Incentive rating (up to 10 points).

Other forms of current monitoring of results are also possible, which are determined by the teachers of the department and recorded in the work program of the discipline.

**The frontier control** is carried out in order to determine the results of the student's development of one credit (module) as a whole. *Frontier control* should be carried out only in writing, at the end of the study of the discipline, the average score of boundary control (BC) is calculated. As forms of *frontier control* of the training module, you can use:

- testing (including computer testing);
- interview with written fixation of students' answers;
- test.

Other forms of intermediate control of results are also possible.

**Intermediate control (mid-term exams)** is carried out in order to check the completeness of knowledge and skills in the material in the middle and end of the semester (2 times per semester) of studying the discipline, by the end of the study of the discipline, the average score of intermediate control (PCsr) is calculated, *forms of intermediate control (mid-term exams) can be:*

- testing (including computer testing);
- interview with written fixation of students' answers;
- test.

Other forms of intermediate control of results are also possible.

**The final control** is carried out during the session, by conducting an exam, it can be carried out in the following forms:

- testing (including computer testing);
- written exam (ticketing system).

**Correspondence of the point-rating system of assessments used by the institute and the assessments of the European system for the transfer of credit units, labor intensity (ECTS)**

Grade						Criterion
System of letters	digital system	Traditional system	Points (%)	Scored points (max - 100)	Evaluation by discipline without an exam	
A	4	5	95-100	95-100	Credited/ passed	"Excellent" - deserves a student who has shown a deep, systematic and comprehensive knowledge of the educational material, who freely performs practical tasks, who has mastered the recommended basic and additional literature on the discipline
A-	3,67		90-94	90-94		"Excellent" - deserves a student who has shown a deep, systematic and comprehensive knowledge of the educational material, who freely performs practical tasks, who has mastered the recommended basic literature on the discipline, but is not familiar with additional literature
B+	3,33	4	85-89	70-89		"Good" - exhibited to a student who has shown a systematic and comprehensive knowledge of the educational material, able to independently replenish and update this knowledge in the course of training, performing practical tasks, familiar with the main literature on the discipline
B	3,0		80-84			"Good" is given to a student who has shown a systematic and comprehensive knowledge of the educational material, who is able to independently replenish this knowledge in the course of training, performing practical tasks, but not fully familiar with the main literature on the discipline
B-	2,67		75-79			"Good" - is given to a student who has shown the systematic nature of knowledge in the discipline, who is able to independently replenish this knowledge in the course of training, performing practical tasks, but not fully familiar with the main literature on the discipline
C+	2,33	3	70-74	50-69		"Satisfactory" - is given to a student who does not have a systematic nature of knowledge in the discipline, who is not capable of independently replenishing and updating knowledge in the course of further education, performing practical tasks with errors
C	2,0		65-69			"Satisfactory" - is given to a student who made mistakes in completing assignments, but who has the necessary knowledge to eliminate them under the guidance of a teacher
C-	1,67		60-64			"Satisfactory" - is set to a student who made errors in the performance of tasks, but who has the possible knowledge to eliminate them under the guidance of a teacher
D+	1,33		55-59			"Satisfactory" - is set to a student who made errors in the performance of tasks, who does not have the necessary knowledge to eliminate them
D-	1,0		50-54			"Satisfactory" - is given to a student who has made significant errors in the performance of tasks, who does not have the necessary knowledge to eliminate them
FX	0,5	2	25-49	Less of 50	not credited/not passed	"Unsatisfactory" - is set to a student who has not completed the task, does not have the necessary knowledge to eliminate them
F	0		0-24			"Unsatisfactory" - is set to a student who has not completed the task, does not have the necessary knowledge to eliminate them, even under the guidance of a teacher

**Academic achievement requirements:**

Attendance by students of all classroom classes without delay is mandatory.

In case of absence, classes are worked out in the order established by the dean's office.



If there are three passes, the teacher has the right not to allow the student to attend classes until the issue is administratively resolved.

If the absence of classes is more than 20.0% of the total number of classes, the student automatically enters the summer semester.

### **Note to the student:**

- ✓ regularly review lecture material;
- ✓ Do not be late and do not miss classes;
- ✓ work off missed classes if you have permission from the dean's office;
- ✓ Actively participate in the classroom (individually and in groups;)
- ✓ timely and fully complete homework assignments;
- ✓ submit all assignments within the time specified by the teacher;
- ✓ independently study the material in the library and at home;
- ✓ timely and accurately fulfill the tasks of the teacher, individual tasks for the IWS to achieve learning outcomes;
- ✓ to master the basic and additional literature necessary for the study of the discipline;
- ✓ performing tasks, the student should not copy or reproduce the work of other students, scientists, practitioners, plagiarism;
- ✓ develop their intellectual and oratory skills;

In case of non-compliance with the requirements of the Memo, the student will be penalized in the form of deducting points (one point for each violated item).

If the requirements of the Memo are fully met, the student is encouraged in the form of an additional 10 points to the final control in the discipline.

### **Academic Integrity, Conduct and Ethics Policy:**

- turn off your cell phone during class;
- Be polite;
- respect other people's opinions;
- formulate objections in the correct form;
- do not shout or raise your voice in the audience;
- independently complete all semester assignments;
- Eliminate plagiarism from your practice;

### **Methodical instructions.**

It is recommended to organize the time required to study the discipline as follows:

***When preparing for a practical lesson***, you must first read the abstract with the teacher's explanations.

***When performing exercises***, you must first understand what you want to do in the exercise, then proceed to its implementation.

***Literature work***. The theoretical material of the course becomes more understandable when books are studied in addition to the abstract. After studying the main topic, it is recommended to perform several exercises.

***Preparation for boundary and intermediate controls***. In preparation for the boundary and intermediate control, it is necessary to study the theory: the definitions of all concepts before understanding the material and independently do several exercises.

***Independent work of students*** is organized on all studied topics of each section. Independent work is carried out in the form of:

- work in Internet sites;
- work with basic and additional literature;
- fulfillment of written assignments;
- preparation of reports, abstracts, tables and posters on