Federal State Budgetary Educational Institution of Higher Education
"Privolzhsky Research Medical University"
Ministry of Health of the Russian Federation

APPROVED
Vice-Rector for Academic Affairs
_____ E.S. Bogomolova
31 August 2021

WORKING PROGRAM

Name of the academic discipline: **CHEMISTRY**

Specialty: **31.05.01 DENTISTRY**

Qualification: **DENTIST**

Faculty: **DENTISTRY**

Mode of study: **FULL-TIME**

Labor intensity of the academic discipline: **72 academic hours**

Nizhny Novgorod
2021

The work program has been developed in accordance with the Federal State Educational Standard for the specialty Dentistry 31.05.03, approved by Order of Ministry of Education No. 984 dated August, 12 2020 .

Developers of the work program:
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Yu.A. Fedorov - Doctor of Chemical Sciences, Professor, Head of the Department of Organic Chemistry Federal State Autonomous Educational Institution of Higher Education "National Research Nizhny Novgorod State University N.I. Lobachevsky,

Developers of the working program:
Full name, academic degree, title, position.

The program was reviewed and approved at the department meeting (protocol No. 01 June 2021 , date)
Head of the Department,
academic degree, academic title _____ (print name)
(signature)

01 June 2021

AGREED
Deputy Head of EMA ph.d. of biology _____ Lovtsova L.V.
(signature)

01 June 2021

1. The purpose and objectives of mastering the academic discipline “Chemistry” (hereinafter – the academic discipline):

1.1. The purpose of mastering the academic discipline: (*participation in forming the relevant competencies).*

The purpose of mastering the discipline: participation in the forming of competencies UC-1, UC-4, GPC-8, GPC-13.

1.2. Tasks of the academic discipline:

To know:

• thermodynamic and kinetic patterns that determine carrying out of chemical and biochemical processes;

• physical and chemical aspects of the most important biochemical processes and various types of homeostasis in the body: theoretical foundations of bioenergetics, factors influencing the shift in the balance of biochemical processes;

• properties of water and aqueous solutions of strong and weak electrolytes;

• main types of equilibria and life processes: protolytic, heterogeneous, ligand-exchange, redox;

• mechanisms of action of body buffer systems, their relationship and role in maintaining acid-base homeostasis; features of acid-base properties of amino acids and proteins;

• patterns of physical and chemical processes in living systems from the point of view of their competition resulting from the combination of different types of equilibria;

• the role of biogenic elements and their compounds in living systems;

• physical and chemical bases of surface phenomena and factors influencing the free surface energy; features of adsorption at different phase boundaries;

• features of physical chemistry of dispersed systems and solutions of biopolymers.

Be able to:

• predict the results of physical and chemical processes occurring in living systems based on theoretical principles;

• scientifically substantiate the observed phenomena;

• make physicochemical measurements that characterize certain properties of solutions, mixtures and other objects that simulate the internal environment of the body;

• present data from experimental studies in the form of graphs and tables;

• to observe the course of chemical reactions and draw reasonable conclusions;

• present the results of experiments and observations in the form of a completed study protocol;

• solve typical practical problems and master the theoretical minimum at a more abstract level;

• solve situational problems based on theoretical principles that model physical and chemical processes occurring in living organisms;

• Moderately navigate the information flow (use reference data and bibliography for one reason or another).

2. Position of the academic discipline in the structure of the General Educational Program of Higher Education (GEP HE) of the organization.

2.1. The discipline "Chemistry" refers to the core part of Block 1 of GEP HE (Academic discipline index). The discipline is studied in the first term.,

2.2. The following knowledge having been formed by school disciplines is required to study the discipline: general chemistry, inorganic chemistry, organic chemistry

2.3. **Mastering the discipline is required for forming the following knowledge, skills and abilities for subsequent academic disciplines:** biochemistry, biology, normal physiology, pathophysiology, pharmacology, hygiene, anesthesiology, rheumatology and intensive care, the basics of nutrition for a healthy and sick person, clinical pharmacology, physiotherapy.

3. Deliverables of mastering the academic discipline and metrics of competence acquisition

Mastering the discipline aims at acquiring the following universal (UC) or/and general professional (GPC) or/and professional (PC) competencies

№	Competence code	The content of the competence (or its part)	Code and name of the competence acquisition metric	As a result of mastering the discipline, the students should:		
				know	be able to	possess
1.	**EC-1**	To be able to carry out a critical analysis of problem situations based on a systematic approach, develop an action strategy	***IEC 1.1*** Knows: methods of critical analysis and evaluation of modern scientific achievements; basic principles of critical analysis ***IEC 1.2*** is able to: gain new knowledge based on analysis, synthesis, etc.; collect data on complex scientific problems related to the professional field; search for information and solutions based on action, experiment and experience	thermodynamic and kinetic patterns that determine the course of chemical and biochemical processes; physical and chemical aspects of the most important biochemical processes and various types of homeostasis in the body: theoretical foundations of bioenergetics, factors affecting the shift in the balance of biochemical processes; properties of water and aqueous solutions of strong and weak electrolytes; - main types of equilibria and life processes: protolytic, heterogeneous, ligand-exchange, redox; - mechanisms of action of buffer systems of	predict the results of physicochemical processes occurring in living systems, based on theoretical provisions; - scientifically substantiate the observed phenomena; - to make physical and chemical measurements that characterize certain properties of solutions, mixtures and other objects that simulate the internal environment of the body; - present data from experimental studies in the form of graphs and tables; - to observe the course of chemical reactions and draw reasonable conclusions; - present the results of experiments and observations in the form of a	Skills of independent work with educational, scientific and reference literature; conduct research and draw generalizing conclusions; - safe work in a chemical laboratory and the ability to handle chemical glassware, reagents, work with gas burners and electrical appliances.
	EC-4	Ability to apply modern communication technologies, including those ones in foreign language(s), for academic and professional interaction	***IEC 4.1*** Knows: basics of oral and written communication in Russian and foreign languages, functional styles of the native language, requirements for business communication, modern means of information and communication technologies ***IEC 4.2*** Knows how to: express their thoughts in Russian and foreign languages in professional communication ***IEC 4.3*** Has practical experience: writing texts in Russian and foreign languages			

	GPC - 8 **GPC-13**	Able to use the basic physicochemical, mathematical and natural science concepts and methods in solving professional problems Able to solve standard tasks of professional activity using information, bibliographic resources, biomedical terminology, information and communication technologies taking into account the basic requirements of information security	related to professional activities; experience in translating medical texts from a foreign language into Russian; experience of speaking Russian and foreign languages ***IGPC 8.1*** Knows: basic physicochemical, mathematical and natural science concepts and methods that are used in medicine **IGPC 8.2** Able to: interpret data from basic physical-chemical, mathematical and natural-science research methods in solving professional problems ***IGPC 8.3*** Has practical experience: application of basic physical-chemical, mathematical and natural-science research methods in solving professional proble ***IGPC 13.1*** Knows: the capabilities of reference and information systems and professional databases; methods of information search, information and communication technologies; modern medical and biological terminology; basics of information security in professional activity ***IGPC 13.2*** Able to: apply modern information and communication technologies to solve	the body, their relationship and role in maintaining acid-base homeostasis; features of acid-base properties of amino acids and proteins; - patterns of physical and chemical processes in living systems from the point of view of their competition arising from the combination of different types of equilibria; - the role of biogenic elements and their compounds in living systems; physical and chemical bases of surface phenomena and factors; - affecting the free surface energy; features of adsorption at different phase boundaries; - features of physical chemistry of disperse systems and solutions of biopolymers	completed research protocol; - solve typical practical problems and master the theoretical minimum at a more abstract level; - to solve situational problems, based on theoretical provisions that simulate physical and chemical processes occurring in living organisms; - moderately navigate the information flow (use reference data and bibliography for one reason or another).	

			problems of professional activity; to carry out an effective search for information necessary to solve the problems of professional activity using reference systems and professional databases; use modern medical and biological terminology; master and apply modern information and communication technologies in professional activities, taking into account the basic requirements of information security			

4. Sections of the academic discipline and competencies that are formed when mastering them

№	Competence code	Section name of the discipline	The content of the section in teaching units
1.	**EC-1, EC-4 GPC-8, GPC-13**	Elements of chemical thermodynamics, thermodynamics of solutions and chemical kinetics	Subject and methods of chemical thermodynamics. The relationship between the processes of metabolism and energy in the body. Chemical thermodynamics as a theoretical basis for bioenergetics. Basic concepts of thermodynamics. Intensive and extensive parameters. State function. Internal energy. Work and heat are two forms of energy transfer. Types of thermodynamic systems (isolated, closed, open). Types of thermodynamic processes (isothermal, isobaric, isochoric). Standard state. First law of thermodynamics. Enthalpy. Standard enthalpy of formation of a substance, standard enthalpy of combustion of a substance. Standard enthalpy of reaction. Hess' law. Application of the first law of thermodynamics to biosystems. The second law of thermodynamics. Reversible and irreversible processes in the thermodynamic sense. Entropy. Gibbs energy. Forecasting the direction of spontaneous processes in isolated and closed systems; the role of enthalpy and entropy factors. Thermodynamic equilibrium conditions. Standard Gibbs energy of formation of matter, standard Gibbs energy of biological oxidation of matter. Standard Gibbs energy of the reaction. Examples of exergonic and endergonic processes occurring in the body. The principle of energy conjugation. chemical balance. Reversible and irreversible in the direction of the reaction. Thermodynamic equilibrium conditions in isolated and closed systems. Chemical equilibrium constant. Common constant for sequential and parallel processes. Equations of the isotherm and isobar of a chemical reaction. Predicting the shift of chemical equilibrium. The concept of buffer action, homeostasis and stationary state of a living organism. Subject and basic concepts of chemical

			kinetics. Chemical kinetics as a basis for studying the rates and mechanisms of biochemical processes. Reaction rate, average reaction rate in the interval, true rate. Classifications of reactions used in kinetics: reactions, homogeneous, heterogeneous and microheterogeneous; simple and complex reactions (parallel, sequential, conjugated, chain). Molecularity of the elementary act of the reaction. Kinetic equations. Reaction order. half-life. Dependence of reaction rate on concentration. Kinetic equations of reactions of the first, second and cool orders. Experimental methods for determining the rate and rate constant of reactions. The dependence of the reaction rate on temperature. The temperature coefficient of the reaction rate and its features for biochemical processes. The concept of the theory of active collisions. Energy profile of the reaction; activation energy; Arrhenius equation. The role of the steric factor. The concept of the theory of the transition state. Catalysis. Homogeneous and heterogeneous catalysis. Energy profile of the catalytic reaction. Features of the catalytic activity of enzymes. Michaelis-Menten equation and its analysis
2.	**EC-1, EC-4 GPC-8, GPC 3**	the doctrine of solutions	The role of water and solutions in life. Physical and chemical properties of water, which determine its unique role as the only biosolvent.; influence of external conditions on solubility. Thermodynamics of dissolution. The concept of an ideal solution. . Solubility constant. Conditions for dissolution and formation of precipitation. Colligative properties of dilute solutions of non-electrolytes. Raoult's law and consequences from it; lowering the crystallization temperature, raising the boiling point of solutions, osmosis. Osmotic pressure, van't Hoff's law. Osmotic properties of electrolyte solutions. Hypo-, hyper- and isotonic solutions. Isotonic ratio. The concept of isoosmia (electrolyte homeostasis). Osmolality and osmolarity of biological fluids and perfusion solutions. The role of osmosis in biological systems. Plasmolysis and hemolysis Elements of the theory of electrolyte solutions. Strong and weak electrolytes. Ionization constant of a weak electrolyte. Ostwald's breeding law. Elements of the theory of solutions of strong electrolytes Debye-Hückel. Ionic strength of the solution. Activity and activity coefficient of ions. Electrolytes in the body.
3.	**EC-1, EC-4 GPC-8, GPC-13**	The main types of chemical equilibria and processes in the functioning of living systems.	Protolytic reactions. Ionization of weak acids and bases. Acidity and basicity constant. Relationship between acidity constant and basicity constant in a conjugated protolytic pair. Competition for a proton: isolated and combined protolytic equilibria. General constant of combined protolytic equilibrium. Salt hydrolysis. Degree and constant of hydrolysis. Ampholytes. isoelectric point. Buffer action is the main mechanism of protolytic homeostasis of the body. The mechanism of action of buffer systems. Buffer zone and buffer capacity. Calculation of the pH of protolytic systems. Buffer systems of blood: bicarbonate, phosphate, hemoglobin, protein. The concept of the acid-base state of the body. Heterogeneous reactions in electrolyte solutions. Solubility constant. Competition for a cation or anion: isolated and combined heterogeneous equilibria in electrolyte solutions. General constant of combined heterogeneous equilibrium. Conditions for the formation and dissolution of precipitates. Reactions underlying the formation of the inorganic substance of bone tissue calcium hydroxide phosphate. The mechanism of functioning of the calcium-phosphate buffer. The phenomenon of isomorphism: the replacement of hydroxide ions in calcium hydroxide ions with fluorine ions, calcium ions with

			strontium ions. complex compounds. ligand exchange reactions. The main provisions of Werner's coordination theory. Complexing agent, ligands, coordination number, denticity. Spatial structure of complex compounds. Classes of complex compounds: intracomplex, anionic, cationic, neutral. Complexons, their application in medicine. Ionic equilibrium in solutions of complex compounds. The idea of the structure of metalloenzymes. Complex ion instability constant. complex organic ligands. Mechanism of toxic action of heavy metals based on hard and soft acids and bases (HMCA). Body fluids and tissues as conductors of the second kind. Specific and equivalent electrical conductivity, their change with dilution of the solution. Equivalent electrical conductivity at infinite dilution. Absolute speed of movement and mobility of ions. Kohlrausch's law on the independent mobility of ions. Hydration of ions. Conductometric determination of the degree and constant of ionization of a weak electrolyte. Conductometric titration. Electrical conductivity of cells and tissues in normal and pathological conditions. Electrode potentials and mechanisms of their occurrence. Nernst equation for calculation of electrode potentials. Reversible electrodes of the first and second kind. Normal electrode potentials. Measurement of electrode potentials. Normal hydrogen electrode. Silver chloride reference electrode. glass electrode. Ion selective electrodes. Redox systems. Redox potentials, the mechanism of their occurrence, biological significance. Peters equation. Potentiometric methods for measuring pH. Potentiometric titration. Polarography and its application in biomedical research
4.	**EC-1, EC-4 GPC-8, GPC-13**	Physical chemistry of dispersed systems in the functioning of living systems. IUD solutions	Classification of disperse systems: according to the degree of dispersion, according to the state of aggregation of phases, according to the strength of intermolecular interaction between the dispersed phase and the dispersion medium. The nature of the colloidal state. Molecular-kinetic properties of colloid-dispersed systems. Optical properties: scattering of light. Electrokinetic properties: electrophoresis and electroosmosis. The structure of the double electric layer. Electrokinetic potential and its dependence on various factors. Stability of dispersed systems. stability of the CDS. Coagulation. Threshold of coagulation and its definition. Colloidal protection and peptization. Coagulation in biological systems.. Colloidal surfactants. Biologically important colloidal surfactants (soaps, detergents, bile acids). Micellization in surfactant solutions. Liposomes

5. Volume of the academic discipline and types of academic work

Type of educational work	Labor intensity		Labor intensity (AH) in semesters
	volume in credit units (CU)	volume in academic hours (AH)	
Classroom work, including	**3**	**108**	**108**
Lectures (L)	*0,39*	**14**	**14**
Laboratory practicum (LP)*	*1,44*	**52**	**52**
Practicals (P)			
Seminars (S)			
Student's individual work (SIW)	*1,17*	**42**	**42**
Mid-term assessment			
credit/exam *(specify the type)*			
TOTAL LABOR INTENSITY	**3**	**108**	**108**

6. Content of the academic discipline

6.1. Sections of the discipline and types of academic work

№	Name of the section of the academic discipline	Types of academic work* (in AH)					
		L	LP	P	S	SIW	total
1	Elements of chemical thermodynamics, thermodynamics of solutions and chemical kinetics. Conditions of chemical equilibrium.	4	9			10	23
2	The doctrine of solutions	6	20			9	35
3	The main types of chemical equilibria and processes in the functioning of living systems	2	12			11	25
4	Physical chemistry of dispersed systems in the functioning of living systems. IUD solutions	2	11			12	25
	TOTAL	***14***	**52**			**42**	**108**

* - L – lectures; LP – laboratory practicum; P – practicals; S – seminars; SIW – student's individual work.

6.2. Thematic schedule of educational work types:

6.2.1 Thematic schedule of lectures

№	Name of lecture topics	Volume in AH Semester 1
1	Elements of chemical thermodynamics and bioenergetics. The first l, the second law of thermodynamics to biosystems. Entropy. Gibbs energy.	2
2	Kinetics of chemical and biochemical reactions. The dependence of the reaction rate on various factors. Catalysis. Kinetic chemical equilibrium. Thermodynamics of chemical equilibrium.	2
3	Colligative properties of solutions of non-electrolytes and electrolytes.	2
4	The main types of chemical equilibria in living systems. Theories of acids and bases. Acid-base balance. Solutions of strong electrolytes. Hydrogen index.	2
5	Hydrolysis. Buffer systems, mechanism of their action. Buffer capacity, buffer systems of living organisms.	2
6	Redox equilibria and processes. Theory of the emergence of electrode, redox and membrane potentials. Electrochemical research methods.	2
7	Physical chemistry of dispersed systems in the functioning of living organisms. The nature of the colloidal state. Dialysis. Optical properties. double electrical layer. PAV, NVD.	2
	TOTAL (total - AH)	**14**

6.2.2. The thematic plan of laboratory practicums (*if this type of classes is stipulated in the curriculum*)

№	Name of laboratory practicums	Volume in AH
1	Subject and tasks of general chemistry. Chemical and physico-chemical methods for the analysis of chemical compounds. Elements of qualitative analysis.	3
2	Methods for expressing the concentration of solutions Preparation of solutions of a given concentration. Preparation of a solution of oxalic acid from a sample. Preparation of 0.1 N. solutions of mineral acids from concentrated solutions.	3
3	Acid –base method of measure analysis. (Neutralization method). Determination of normality and titer of alkali solution by a standard solution of oxalic acid. Determination of normality and titer of acid solution by the titrant of alkali.	3
4	**Oxidation-reduction mesure analysis. (Permanganatometry).** Determination of normality and titer of a potassium permanganate solution by a standard solution of oxalic acid. Determination of normality and titer of hydrogen peroxide solution by the titrant of potassium permanganate.	3
5	Elements of chemical thermodynamics and bioenergetics. Determination of the thermal effect of the neutralization reaction. Determination of the heat of hydration of copper (II) sulfate.	3
6	Kinetics of chemical and biochemical reactions. Determination of the dependence of the reaction rate on the concentration of reactants (interaction of iron (III) chloride with potassium iodide, measurement of the decomposition rate of sodium thiosulfate).	3
7	Thermodynamic and kinetic conditions of chemical equilibrium. Balance shift. Laboratory works.	3
8	Solutions. Colligative properties of solutions of non-electrolytes and electrolytes. Determination of the molar mass of a non-electrolyte by the Rast method.	3
9	The main types of chemical equilibria and processes in the functioning of living systems. Theories of acids and bases. Homogeneous and heterogeneous equilibria. Determination of pH of various solutions. Determination of pH solutions	3
10	Salt hydrolysis. Buffer solutions Hydrolysis of salts. Determination of the medium of solutions of hydrolyzable salts. Preparation of buffer solutions. The mechanism of action of buffer solutions. Determination of the buffer capacity of the solution.	3
11	Chemistry of biogenic elements of the s-block. Analytical reactions to cations of s-block elements. Protection of abstracts	3
12	Complex compounds on the example of compounds of d-elements. Chemistry of biogenic elements of the d-block. Analytical reactions to cations of elements of the d-block. Abstract protection.	3
13	Chemistry of biogenic elements of the p-block. Analytical reactions to cations of p-block elements. Abstract protection.	3
14	The mechanism of occurrence of electrode, redox and membrane potentials. Electrical conductivity of electrolyte solutions. Calculation of the constant and degree of dissociation of weak electrolytes. Potentiometric titration.	3
15	Physico-chemistry of surface phenomena. Determination of surface tension at the liquid-gas interface.	3
16	Colloidal solutions. Preparation of colloidal solutions. Purification of colloidal solutions by dialysis. Determination of the particle charge of colored sols.	3

17	Properties of IUD solutions. Determination of the isoelectric point of gelatin. Establishment of the coefficient of swelling of gelatin.	4
	TOTAL (total - AH)	**52**

6.2.3. Thematic plan of practicals. This type of training is not included in the curriculum)

6.2.4. Thematic plan of seminars. This type of training is not included in the curriculum.

6.2.5. Types and topics of student's individual work (SIW)

№	Types and topics of SIW	Volume in AH
1	Preparation for practical exercises and laboratory work, writing a report on the completed laboratory work. Independent solution of thematic situational problems.	32
2	Preparation of abstracts on topics.	10
	TOTAL (total - AH)	42

7. Types of assessment formats for ongoing monitoring and mid-term assessment

№	Semester No.	Types of control		Name of section of academic discipline	Competence codes	Assessment formats		
						types	number of test questions	number of test task options
1.		Current monitoring	Control of mastering the topic	Methods for expressing the concentrations of solutions. Titrimetric methods of analysis. Red-Ox reactions/				Classroom testing (option is formed by the teacher)
			Monitoring the student's individual work			Control	3	18
2		Current monitoring	Control of mastering the topic	Elements of physical chemistry (thermodynamics, kinetics, chemical equilibrium)		Test tasks	20	Classroom testing (option is formed by the teacher)
			Monitoring the student's individual work			Control	3	18
3		Current monitoring	Control of mastering the topic	Solutions. Equilibria in homogeneous and heterogeneous systems.		Test tasks	20	Classroom testing (option is formed by the teacher)
			Monitoring the student's individual work			Control	5	18

4		Current monitoring	Control of mastering the topic	Biogenic elements s, p, d-blocks.		Test tasks	20	Classroom testing (option is formed by the teacher)
			Monitoring the student's individual work			Control	5	18
5.		Mid-term assessment	Exam/ Credit					

8. Educational, methodological and informational support for mastering the academic discipline (printed, electronic publications, the Internet and other network resources)

8.1. Key literature references

№	Name according to bibliographic requirements	Number of copies	
		at the department	in the library
1	Zimina, S. V. General chemistry : practical manual / S. V. Zimina, A. S. Gordetsov, I. V. Zhdanovich ; Privolzhsky Research Medikal University, . – N. Novgorod : Publishing House of the Privolzhsky Research Medikal University, 2018. – 194 p.	61	
2	Zimina, S. V. Chemistry : practical manual / S. V. Zimina, A. S. Gordetsov, I. V. Zhdanovich. – N. Novgorod : Publishing House of PRMU, 2019. – 194 p.	299	

8.2. Further reading

№	Name according to bibliographic requirements	Number of copies	
		at the department	in the library
1	Silberberg, M. S. Principles of general chemistry / M. S. Silberberg ; Silberberg Martin S. – 2nd ed. – Boston : McGraw-Hill Higher Education, 2007. – 891 с. : ил. мяг. – ISBN 978-0-07-017263-0.	52	
2	Lister, T. New understanding chemistry for advanced level / T. Lister, J. Renshaw ; Lister, Ted ; Renshaw, Janet. – 3d ed. – Nelson thornes, 2000. – 680 с. : ил. мяг. – ISBN 0-7487-3958-0(ошибоч.).	50	
3	General chemistry : practical manual / S. V. Zimina, A. S. Gordetsov, Nizhny Novgorod State Medical Academy, I. V. Zhdanovich ; Zimina, S. V. ; Zhdanovich, I. V. ; Gordetsov, A. S. ; Nizhny Novgorod State Medical Academy. – N. Novgorod : Nizhny Novgorod State Medical Academy, 2008. – Текст : электронный.		

8.3. Electronic educational resources for teaching academic subjects

8.3.1. Internal Electronic Library System of the University (IELSU)

№	*Name of the electronic resource*	*Brief description (content)*	*Access conditions*	*Number of users*

8.3.2. Electronic educational resources acquired by the University

№	*Name of the electronic resource*	*Brief description (content)*	*Access conditions*	*Number of users*

8.3.3 Open access resources

№	*Name of the electronic resource*	*Brief description (content)*	*Access conditions*

9. Material and technical support for mastering an academic discipline

9.1. List of premises for classroom activities for the discipline

1. Lecture hall equipped with multimedia equipment and a microphone.
2. Rooms for practical training

9.2. List of equipment for classroom activities for the discipline

1. Multimedia complex
2. Information stands.
3. Tables
4. Slides and multimedia presentations of lectures.
5. Chemical glassware
6. Chemical reagents
7. Microscopes, glass slides
8. Calorimeters
9. Analytical balance

9.3. A set of licensed and freely distributed software, including domestic production

Item no.	**Software**	**number of licenses**	**Type of software**	**Manufacturer**	**Number in the unified register of Russian software**	**Contract No. and date**
1	Wtware	100	Thin Client Operating System	Kovalev Andrey Alexandrovich	1960	2471/05-18 from 28.05.2018
2	MyOffice is Standard. A corporate user license for educational organizations, with no expiration date, with the right to	220	Office Application	LLC "NEW CLOUD TECHNOLOGIES"	283	without limitation, with the right to receive updates for 1 year.

	receive updates for 1 year.					
3	LibreOffice		Office Application	The Document Foundation	Freely distributed software	
4	Windows 10 Education	700	Operating systems	Microsoft	Azure Dev Tools for Teaching Subscriptio n	
5	Yandex. Browser		Browser	«Yandex»	3722	
6	Subscription to MS Office Pro for 170 PCs for FGBOU VO "PIMU" of the Ministry of Health of Russia	170	Office Application	Microsoft		23618/HN100 30 LLC "Softline Trade" from 04.12.2020

10. List of changes to the working program (to be filled out by the template)

Federal State Budgetary Educational Institution of Higher Education
"Privolzhsky Research Medical University"
Ministry of Health of the Russian Federation
(FSBEI HE "PRMU" of the Ministry of Health of Russia)

Department of
Name of the department

CHANGE REGISTRATION SHEET

working program for the academic discipline
NAME OF THE ACADEMIC DISCIPLINE

Field of study / specialty / scientific specialty: _____
(code, name)

Training profile: _____
(*name) - for master's degree programs*

Mode of study: _____
full-time/mixed attendance mode/extramural

Position	Number and name of the program section	Contents of the changes made	Effective date of the changes	Contributor's signature
1				

Approved at the department meeting
Protocol No. _____of _____20__

Head of the Department

_____ _____/_____
department name, academic title signature print name