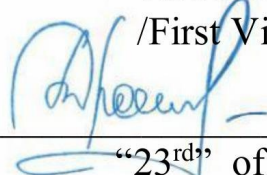


Документ подписан простой электронной подписью  
Информация о владельце:  
ФИО: Стегний Кирилл Владимирович  
Должность: И.о. ректора  
Дата подписания: 25.09.2026 05:37:43  
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**Federal State Budget Educational Institution  
of Higher Education  
Pacific State Medical University  
of the Ministry of Health of the Russian Federation**

APPROVED BY

/First Vice-Rector



/ Dvoynikova E.R./

“23<sup>rd</sup>” of June 2026

**THECOURSE(MODULE) PROGRAM**

**B1.C.06 CHEMISTRY**

(name of the discipline(module))

**Speciality**

31.05.03 Dentistry for international students (on-line educational program, language of instruction is English, by People's Republic of China)

**Degree Level**

Specialist degree

**Specialization**

02 Healthcare

**Mode of Study**

full-time

**Duration of the CEP**

5 years

**Institute/Department**

Fundamentals and information technologies in  
medicine

Vladivostok, 2026

When developing the working program of the discipline (module) **B1.O.06 CHEMISTRY** is based on:

- 1) Federal State Educational Standard for Higher Education in the specialty 31.05.03 Dentistry, approved by Order No. 984 dated August 12, 2020 of the Ministry of Science and Higher Education of the Russian Federation.
- 2) Curriculum for the 31.05.03 Dentistry for foreign students (English-language program), profile 02 "Healthcare" (in the field of providing health care in patients with dental pathology), approved by the Academic Council of FSBEI HE PSMU of the Ministry of Health of Russia Report No. 1-7/25-26 dated March 27, 2026.

The working program of the discipline was developed by the team of the department/institute Fundamentals and information technologies in medicine of the Federal State Budgetary Educational Institution of Higher Medical Education of the Ministry of Health of the Russian Federation, under the supervision of the head of the department/director of the Institute, associate professor Dr. V. N. Bagriantsev.

Developers:

\_\_\_\_\_  
Associate professor  
(current position)

\_\_\_\_\_  
PhD, chemistry  
(academic degree, academic  
title)

\_\_\_\_\_  
Zadorozhnaia A.N.  
(Full name)

## 1. GENERAL PROVISIONS

### 1.1. The purpose and objectives of the discipline **B1.O.05 CHEMISTRY**

The goal of mastering the discipline is to acquire systematic knowledge about the chemical and biological essence of processes occurring in the organism at the cellular and molecular levels with the participation of organic and inorganic substances, as well as the ability to perform calculations of the parameters of these processes using physical, chemical and mathematical apparatus.

Objectives of the discipline (module) are:

- teaching of students to the ability to identify patterns in the course of chemical and biological processes from the point of view of their competition, which arises as a result of combining equilibria of different types;
- teaching of students to the ability to identify the properties of substances of organic and inorganic nature that determine the characteristics of their behavior and relationships in chemical reactions and life processes;
- developing of practical skills of the students in planning and carrying out experimental work with subsequent mathematical processing of the obtained data.

## 2. PLACE OF DISCIPLINE (MODULE) IN THE STRUCTURE OF THE MAIN EDUCATIONAL PROGRAM

Discipline **B1.O.05 CHEMISTRY** refers to the major part Block I of the main educational program of the specialty 31.05.03 Dentistry and it is studied in the I semester.

### 3. PLANNED LEARNING OUTCOMES FOR THE DISCIPLINE

3.1. The discipline **B1.O.05 CHEMISTRY** is aimed at developing general professional competencies. The discipline provides students with the formation of competencies, depending on the types of tasks of their professional activity.

| Competence code                                      | Formulation of competence                                                                                                             | Indicators of competence achievement                                                                                                                                                                                                                                                                                                                                                                                       |
|------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>General professional competencies</b>             |                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Basic principles of fundamental and natural sciences | GPC-8. Able to use basic physical, chemical, mathematical and natural science concepts and methods dealing with professional problems | AI.GPC-8 <sub>1</sub> - uses basic physical, chemical, mathematical and natural science concepts<br>AI.GPC-8 <sub>2</sub> - knows basic physical, chemical, mathematical, and natural science methods and applies them to deal with professional problems<br>AI.GPC-8 <sub>3</sub> - evaluates the effectiveness of basic physical, chemical, mathematical, and natural science methods dealing with professional problems |

3.2. Types of professional activities, based on those formed during the implementation of **B1.O.05 CHEMISTRY** competencies:

Type of professional activity:

Medical

Types of professional tasks:

- implementation and monitoring of the effectiveness of sanitary and anti-epidemic and other preventive measures to protect public health;

- conducting of sanitary and hygienic education among the population and medical personnel in order to form a healthy lifestyle.

3.3. The planned learning outcomes in the discipline (module) are expressed in knowledge, skills, and (or) work experience. The outcomes characterize the stages of competence formation and ensure the achievement of the planned results of mastering the main educational program. The results of training in the discipline are correlated with indicators of competence achievement.

#### 4. SCOPE AND CONTENT OF THE DISCIPLINE (MODULE)

##### 4.1. Scope of the discipline (module) and types of academic work

| Type of academic work                       |            | Total hours | Semesters   |
|---------------------------------------------|------------|-------------|-------------|
|                                             |            |             | Semester #1 |
|                                             |            |             | hours       |
| 1                                           |            | 2           | 3           |
| Classroom classes (total), including:       |            |             |             |
| Lectures                                    |            | 72          | 72          |
| Practical exercises                         |            | 20          | 20          |
| Independent work of the student, including: |            | 52          | 52          |
| Preparation for classes (PC)                |            | 36          | 36          |
| Preparation for routine control (PRC)       |            | 12          | 12          |
| Preparation for midterm examination (PME)   |            | 12          | 12          |
| Type of midterm examination                 | Credit (S) | Credit (S)  | Credit (S)  |
|                                             | Exam (S)   |             |             |
| Total: Overall labor intensity              | hour.      | 108         | 108         |
|                                             | Cr         | 3           | 3           |

##### 4.2. Content of the discipline

##### 4.2.1. Lecture topics and the number of hours per semester of study of the discipline

| #          | Lecture topics                                                                                                       | Hours |
|------------|----------------------------------------------------------------------------------------------------------------------|-------|
| 1          | 2                                                                                                                    | 3     |
| Semester 1 |                                                                                                                      |       |
| 1.         | Protolytic theory of acids and bases. Protolyticequilibrium. Buffersolutions.                                        | 2     |
| 2.         | Structure of complex compounds. Ligand exchange equilibrium.                                                         | 2     |
| 3.         | Heterogeneous equilibria and processes in electrolyte solutions.                                                     | 2     |
| 4.         | Oxidation-reduction equilibrium and processes. Features of oxidation-reduction processes in the human body.          | 2     |
| 5.         | Basic concepts of thermodynamics. The first and second laws of thermodynamics. Chemical equilibrium.                 | 2     |
| 6.         | Chemical kinetics. Molecularity and order of reaction. Factors influencing reaction rate.                            | 2     |
| 7.         | Adsorption equilibria and processes at mobile and stationary phase boundaries. Factorsinfluencingadsorptioncapacity. | 2     |

|    |                                                                              |           |
|----|------------------------------------------------------------------------------|-----------|
| 8. | Disperse systems. Properties of disperse systems.                            | 2         |
| 9. | Colloidal surfactants. Micelle formation in surfactant solutions. Liposomes. | 2         |
|    | <b>Total hours per semester</b>                                              | <b>18</b> |

4.2.2. Topics of practical classes and the number of hours per semester of study of the discipline

| #          | Practical classes'topics                                                                                     | Hours     |
|------------|--------------------------------------------------------------------------------------------------------------|-----------|
| 1          | 2                                                                                                            | 3         |
| Semester 1 |                                                                                                              |           |
| 1          | Methods of expressing the concentration of solutions.                                                        | 4         |
| 2          | Protolyticequilibria. Acidity and alkalinity of biological fluids. Laboratorywork.                           | 4         |
| 3          | Protolyticequilibria. Properties of buffer solutions. Laboratory work.                                       | 4         |
| 4          | Study of oxidation-reduction equilibria and processes.                                                       | 4         |
| 5          | Test on module №1 "The main types of chemical reactions and processes in the functioning of living systems." | 4         |
| 6          | Basics of chemical thermodynamics. Laboratory work.                                                          | 4         |
| 7          | Chemical kinetics. The influence of various factors on the rate of reactions. Laboratory work.               | 4         |
| 8          | Test on module №2 "Basics of Chemical Thermodynamics. Basics of Chemical Kinetics."                          | 4         |
| 9          | Adsorption on a mobile and stationary phase boundary. Laboratory work.                                       | 4         |
| 10         | Properties of colloidal solutions. Laboratory work.                                                          | 4         |
| 11         | Properties of polymer solutions. Laboratory work.                                                            | 4         |
| 12         | Test on module №3 "Surface phenomena. Adsorption. Colloidal solutions. Polymer compounds."                   | 4         |
| 13         | Midterm control in the discipline <b>Chemistry</b> .                                                         | 4         |
|            | Total hours per semester                                                                                     | <b>52</b> |

4.2.3. Students' selfwork

| #          | Name of the section of the academic discipline (module)                                  | Types of Selfwork                                                                                                        | Total hours |
|------------|------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|-------------|
| 1          | 3                                                                                        | 4                                                                                                                        | 5           |
| Semester 1 |                                                                                          |                                                                                                                          |             |
| 1          | The main types of chemical reactions and processes in the functioning of living systems. | Preparation for classes, preparation for current control, calculation and graphic work, preparation for midterm control. | 12          |
| 2          | Basics of Chemical Thermodynamics. Basics of Chemical Kinetics.                          | Preparation for classes, preparation for current control, calculation and graphic work, preparation for midterm control. | 12          |
| 3          | Surface phenomena. Adsorption. Colloidal solutions. Polymer compounds.                   | Preparation for classes, preparation for current control, calculation and graphic work, preparation for midterm control. | 14          |
|            | Total hours per semester                                                                 |                                                                                                                          | <b>38</b>   |

## 5. CONDITIONS FOR THE IMPLEMENTATION OF THE DISCIPLINE (MODULE)

### 5.1. Educational, methodological and informational support of the academic discipline(module)

#### Basic literature

| # | Name, type of resource                                                                         | Author(s)/Editor                                                                              | Output data, URL address                                                                        | Number of copies(accesses) in LIC |
|---|------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|-----------------------------------|
| 1 | 2                                                                                              | 3                                                                                             | 4                                                                                               | 5                                 |
| 1 | Problems and exercises in general chemistry: a teaching aid (Electronic resource) (In Russian) | Glinka N.L. (Editors V.A. Popkov, A.V. Babkov)                                                | Moscow: Urait Publishing, 2024. – 236 P. URL: <a href="https://urait.ru/">https://urait.ru/</a> | Unlimited access                  |
| 2 | Chemistry in medicine: textbook for universities (Electronic resource) (In Russian)            | Babkov A.V., Nesterova O.V. (Editor V.A. Popkov),                                             | Moscow: Urait Publishing, 2025. – 403 P. URL: <a href="https://urait.ru/">https://urait.ru/</a> | Unlimited access                  |
| 3 | General chemistry in 2 vol: textbook for universities (In Russian)                             | Glinka N.L. (Editors V.A. Popkov, A.V. Babkov), 20 <sup>th</sup> revised and enlarged edition | Moscow: Urait Publishing, 2021. URL: <a href="https://urait.ru/">https://urait.ru/</a>          | Unlimited access                  |

#### Additional literature

| # | Name, type of resource                                                                                                                 | Author(s)/Editor                                                                         | Output data, URL address                                                                        | Number of copies(accesses) in LIC |
|---|----------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|-----------------------------------|
| 1 | 2                                                                                                                                      | 3                                                                                        | 4                                                                                               | 5                                 |
| 1 | General chemistry. Biophysical chemistry. Chemistry of biogenic elements: Textbook for universities (Electronic resource) (In Russian) | Ershov Yu.A., Popkov V.A., Berliand A.S. - 10 <sup>th</sup> revised and enlarged edition | Moscow: Urait Publishing, 2025. – 557 P. URL: <a href="https://urait.ru/">https://urait.ru/</a> | Unlimited access                  |

#### Online resources

1. EBS «Student Consultant» <http://studmedlib.ru/>
2. EBS «University Library online» <http://www.biblioclub.ru/>
3. EBS «Yurait» <https://urait.ru/>
4. EBS «Book Up» <https://www.books-up.ru/>
5. Resources of the LIC FSBE IHE PSMU of the Ministry of Health of Russia PSMU <https://tgmu.ru/university/bibliotechno-informacionnyj-centr/resursy-bic/sobstvennye/>

Online resources and instructions for their use are available on the Library and Information Center page <https://tgmu.ru/university/bibliotechno-informacionnyj-centr/>



#### 5.2. Logistical support of the academic discipline (module)

Information about the material and technical support of the discipline is posted on the official website of the university [Logistical support and equipment of the educational process. Pacific State Medical University of the Ministry of Health of the Russian Federation \(tgmu.ru\)](https://tgmu.ru/university/bibliotechno-informacionnyj-centr/)



**5.3. The list of information technologies used for the implementation of the educational process in the discipline (module), information and reference systems, licensed and freely distributed software, including domestic production:**

1. Polycom Telepresence M100 Desktop Conferencing Application (VKS)
2. SunRav Software tTester
3. 7-PDF Split & Merge
4. ABBYY FineReader
5. Kaspersky Endpoint Security
6. Online testing system INDIGO
7. Microsoft Windows 7
8. Microsoft Office Pro Plus 2013
9. 1C:University
10. The Guarantor
11. MOODLE(modular object-oriented dynamic learning environment)

**6. THE SPECIFICS OF THE DISCIPLINE'S IMPLEMENTATION FOR STUDENTS WITH DISABILITIES AND PEOPLE WITH DISABILITIES**

**6.1. Availability of appropriate conditions for the implementation of the discipline**

For students with disabilities and people with disabilities, on the basis of a written application, the discipline is implemented taking into account the characteristics of psychophysical development, individual capabilities and health state (hereinafter referred to as individual characteristics). The following general requirements are presented: the use of special technical training facilities for collective and individual use, the provision of the services of an assistant who provides such students with the necessary technical assistance, access to buildings and premises where classes are held, and other conditions without which it is impossible or difficult to study the discipline.

**6.2. Ensuring compliance with general requirements**

When implementing the discipline, the following general requirements are provided on the basis of a written application from the student: conducting classes for students with disabilities and people with disabilities in the same classroom with students without disabilities, if this does not create difficulties for students; the presence in the classroom of an assistant (assistants) who provides students with the necessary technical assistance taking into account their individual characteristics; the use of technical means necessary for students, taking into account their individual characteristics.

**6.3. Bringing to the attention of students with disabilities, in a form accessible to them, all local regulations of the Federal State Budgetary Educational Institution of Higher Education PSMU of the Ministry of Health of the Russian Federation.**

All local regulations of the Federal State Budgetary Educational Institution of Higher Education PSMU of the Ministry of Health of the Russian Federation on the implementation of the discipline (module) are brought to the attention of students with disabilities in a form accessible to them.

**6.4. Implementation of an increase in the duration of the midterm examination in relation to the established duration for students with disabilities**

The form of the current and interim certification in the discipline for students with disabilities and persons with disabilities is established taking into account individual psychophysical characteristics (orally, in writing on paper, in writing on a computer, in the form of testing, etc.).

The duration of the interim certification in relation to the established duration is increased upon written application of the student with disabilities. The duration of the student's preparation for the test is increased by at least 0.5 hours.

## 7. STAFFING OF THE DISCIPLINE

The composition of scientific and pedagogical staff who ensure the implementation of the educational process in the discipline meets the requirements of the Federal State Educational Standard for Higher Education in the specialty 31.05.03 Dentistry and is posted on the educational organization's website.



## 8. EDUCATIONAL WORK IN THE IMPLEMENTATION OF DISCIPLINE

| Type of educational work        | Forms and directions of educational work                                                                                                                                                                                                                                                                                          | Assessment criteria |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| Personal development assistance | Direct type<br>Discipline Chemistry<br>Conversations and problematic debates on promoting a healthy lifestyle<br>Participation in interdepartmental conferences on the formation of a culture of healthy lifestyle, the development of the ability to preserve and improve the health                                             | Portfolio           |
|                                 | Indirect type – creating an atmosphere, infrastructure<br>Discipline Chemistry<br>Formation of a culture of leading a healthy lifestyle, development of the ability to preserve and improve health<br>Creating a friendly and respectful atmosphere with a high level of communication skills in the implementation of discipline |                     |
| Civic Values                    | Direct type<br>Discipline Chemistry<br>Conducting events that promote civil law culture (round tables, debates, talks)<br>Current short debates in the presence of special events                                                                                                                                                 | Portfolio           |
|                                 | Indirect type<br>Discipline Chemistry<br>Focusing on common civil value orientations and law culture<br>Conscious citizenship in the implementation of professional activities                                                                                                                                                    |                     |
| Social Values                   | Direct type<br>Discipline Chemistry<br>Coverage of issues related to the organization of a                                                                                                                                                                                                                                        | Portfolio           |

|  |                                                                                                                                                                                             |  |
|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
|  | <p>healthy lifestyle based on health-saving technologies</p> <p>Coverage of environmental issues, environmental problems as a factor affecting public health and individual group risks</p> |  |
|  | <p>Indirect type</p> <p>Discipline Chemistry</p> <p>Identification in the social structure during education and professional activity</p>                                                   |  |