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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

Director of the Institute of
Fundamentals and Information
Technologies in Medicine
_____ / Bagryantsev V.N./
"4th" of April 2025

SUBJECT GUIDE FOR TEACHERS AND STUDENTS FOR

Б1.О.05 Mathematics in dentistry

(Name of discipline)

Specialty	**31.05.03 Dentistry for international students (in English)** (code, name)
Degree	Specialist's degree
Profile	02 "Healthcare" (in the field of providing health care in patients with dental pathology)
Mode of study	**Full-time**
Period of mastering the BEP	**5 years** (nominal length of study)
Institute	of Fundamentals and Information Technologies in Medicine

Vladivostok, 2025

Subject guide for teachers and students for **Б1.О.05 Mathematics in dentistry** is based on:

1) Federal State Educational Standard of Higher Education for the specialty approved by the Order No. 988 of Ministry of Science and Higher Education of the Russian Federation dated August 12, 2020.

2) Curriculum for the 31.05.03 Dentistry for international students (in English), 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. 8/24-25 dated March 31, 2025.

Subject guide for teachers and students for the discipline were developed by the writing team of the Institute of Fundamentals and Information Technologies in Medicine of the FSBEI HE PSMU of the Ministry of Health of Russia, under the guidance of the director of the institute Candidate of Medical Sciences Bagryantsev V.N.

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1. GENERAL PROVISIONS

Subject guide for **Б1.О.05 Mathematics in dentistry** is a set of recommendations and explanations that facilitate to optimal organization of mastering this discipline.

Regular analysis of lecture materials and work with end-of-the-text questions are necessary for better understanding of the material and systematization of knowledge of **Б1.О.05 Mathematics in dentistry**. Particular attention should be paid to emerging questions, confusing terms, and conflicts of points of view during the independent review of the lecture material. If necessary, a student should contact the teacher for advice. Lecture material streamlines students' thinking, while practical classes provide deeper insight into the material of the discipline.

Special attention should be paid to the content of the main provisions and conclusions, explanation of phenomena and facts, and clarification of the practical application of theoretic aspects of topic when preparing for a practical class. During this process students should aim to understand and remember the main provisions of the material under consideration, examples provided, as well as understand the illustrative material.

Collections of assessment tools are used to organize independent study of topics (questions) of the discipline.

Independent work of students is facilitated by the following:

1. availability and accessibility of the necessary educational and reference material;
2. a system of regular quality control of completed independent work;
3. availability of teacher's advice.

Subject guides for self-study are presented as literary sources and subject guides for the students. Subject guides for independent work of students include a list of library resources of the educational institution and other materials accessible to students.

Independent work is a type of in-person extracurricular work of teachers and students of **Б1.О.05 Mathematics in dentistry**. Control of independent work is conducted by the leading teacher. Evaluation of independent work results is taken into account when conducting interim examination of students throughout the **Б1.О.05 Mathematics in dentistry** course.

Continuous assessment during the **Б1.О.05 Mathematics in dentistry** course is implemented in order to check indicators of achieving competencies, to stimulate students' academic work, and improve methods of mastering new knowledge. Continuous assessment during the **Б1.О.05 Mathematics in dentistry** course is conducted during the semester to assess all types and sections of the academic discipline that encompass the competencies developed by the discipline: working with tests, solving practice problems, and conducting laboratory classes. Continuous assessment of students' knowledge and results of their preparation for practical classes is conducted during every class session.

Interim assessment aims to determine the level of mastery of competency indicators. It is conducted in the test format after the student has mastered all sections of **Б1.О.05 Mathematics in dentistry** and takes into account learning outcomes for all types of student work over the entire period of mastering the **Б1.О.05 Mathematics in dentistry** course.

Time allotted for interim assessment is indicated in the schedule.

Assignments given during practical classes, as well as assignments aimed to prepare students for continuous and interim assessment, are included in the collection of assessment tools for **Б1.О.05 Mathematics in dentistry**. If necessary, students should contact the teacher for advice. It is necessary to thoroughly think over questions that need clarification before seeking teacher's advice.

2. SUBJECT GUIDES FOR LECTURE CLASSES

Table 1. Subject Guides for **Б1.О.05 Mathematics in dentistry** Lectures

Topic No.1 Basics of vector algebra	
Duration of the lecture (in academic hours):	5
Purpose of the lecture: 1. tell students about practical applications of vectors in dentistry; 2. define key terminology: vectors, operations with vectors, vector coordinates vector length, vector projections, directed cosines; 3. examine problem solving methods.	
Lecture plan, order of presentation of its sections: - Basic definitions - Linear operators on vectors - Projections on an axis - Vector coordinates	
Recommended reading: 1. Omelchenko V.P. Mathematics: textbook. – (М.: ГЭОТАР-Медиа), 2020. - 304 p. URL: https://www.studentlibrary.ru/ 2. Bavrin I.I. Higher mathematics for chemists, biologists and physicians: textbook and practical course for universities. 2nd ed — (Москва: Издательство Юрайт), 2021. — 397 p. — URL: https://urait.ru	
Topic No.2 Elements of vector algebra	
Duration of the lecture (in academic hours):	5
Purpose of the lecture: 1. tell students about different types of vector products; 2. define key terminology: scalar multiplication, vector multiplication, and mixed multiplication; 3. examine problem solving methods.	
Lecture plan, order of presentation of its sections: - Scalar multiplication - Vector multiplication - Mixed multiplication	
Recommended reading: 1. Omelchenko V.P. Mathematics: textbook. – (М.: ГЭОТАР-Медиа), 2020. - 304 p. URL: https://www.studentlibrary.ru/ 2. Bavrin I.I. Higher mathematics for chemists, biologists and physicians: textbook and practical course for universities. 2nd ed — (Москва: Издательство Юрайт), 2021. — 397 p. — URL: https://urait.ru	

3. SUBJECT GUIDES FOR PRACTICAL CLASSES

Table 2. Subject Guides for Practical **Б1.О.05 Mathematics in dentistry** Classes

Topic No.1 Basics of vector algebra	
Duration of the practical class (in academic hours):	2

Purpose of the practical class: 1. consolidate acquired knowledge on vectors; 2. during the discussion, outline how basic operations on vectors work; 3. thoroughly go over definitions and concepts of vectors, vector fields, vector coordinates, vector fields; collinearity; coplanarity; projections; directional cosines; 4. study properties of linear operators on vectors.
Practical classes requirements: classrooms equipped with multimedia equipment, blackboards, and subject guides for the discipline
Independent work of the student: working with educational literature, solving typical practice problems.
Methods of evaluation of acquired knowledge and skills: classroom questioning, working with tests.
Recommended reading: 1. Omelchenko V.P. Mathematics: textbook. – (М.: ГЭОТАР-Медиа), 2020. - 304 p. URL: https://www.studentlibrary.ru/ 2. Bavrin I.I. Higher mathematics for chemists, biologists and physicians: textbook and practical course for universities. 2nd ed — (Москва: Издательство Юрайт), 2021. — 397 p. — URL: https://urait.ru
Topic No.2 Elements of vector algebra

Duration of the practical class (in academic hours):	2

Purpose of the practical class: 1. consolidate acquired knowledge on vectors; 2. during the discussion, outline the basic properties of the scalar product, vector product and mixed product of vectors; 3. thoroughly go over definitions and concepts of scalar product, vector product and mixed product of vectors; 4. practice using scalar, vector and mixed product of vectors.
Practical classes requirements: classrooms equipped with multimedia equipment, blackboards, and subject guides for the discipline
Independent work of the student: working with educational literature, solving typical practice problems.
Methods of evaluation of acquired knowledge and skills: classroom questioning, working with tests.
Recommended reading: 1. Omelchenko V.P. Mathematics: textbook. – (М.: ГЭОТАР-Медиа), 2020. - 304 p. URL: https://www.studentlibrary.ru/ 2. Bavrin I.I. Higher mathematics for chemists, biologists and physicians: textbook and practical course for universities. 2nd ed — (Москва: Издательство Юрайт), 2021. — 397 p. — URL: https://urait.ru

4. GUIDELINES FOR CONTINOUS AND INTERIM ASSESSMENT

Table 3. Guidelines for Conducting Continuous and Interim Assessment during the **Б1.О.05 Mathematics in dentistry** Course

Type of assessment	Assessment format
Continuous assessment	- conducting and evaluating oral or written quizzes during lectures and practical classes; - assessment and evaluation of completion and results of assignments given during practical classes; - assess and evaluate completion and results of individual assignments and exam tasks given during practical classes.
Interim certification	is conducted in test format; it allows to assess the development of students' competencies correlating with types of professional activity.

5 ASPECTS OF THE IMPLEMENTATION OF THE COURSE FOR STUDENTS WITH DISABILITIES AND SPECIAL NEEDS

5.1. Availability of accessible environment

For students with disabilities and special needs, if a written application is submitted, lectures and practical classes are carried out taking into account health limitations, individual capabilities and medical status (hereinafter referred to as individual characteristics) of the student. Compliance with the following general requirements is ensured: teaching aids for collective and individual use are provided, required technical assistance is provided by an assistant, buildings and premises where lectures and practical classes are taking place meet accessibility requirements, other arrangements lack of which makes it impossible or difficult to master the discipline are made.

5.2. Compliance with general requirements

When lectures and practical classes are carried out at the written application of the student, the following general requirements are met: lectures and practical classes for students with disabilities and special needs take place at the same location as for students who do not have disabilities, if this does not cause difficulties for students; an assistant (assistants), who provide(s) students with the necessary technical assistance taking into account individual characteristics of the student, is (are) provided; necessary teaching aids are provided, taking into account individual characteristics of the student.

5.3. Availability of the internal policies and procedures of FSBEI HE PSMU of the Ministry of Health of Russia to students with disabilities in a form accessible to them.

All internal policies and procedures of FSBEI HE PSMU of the Ministry of Health of Russia concerning the discipline are made available to students with disabilities in a form accessible to them.

5.4. Increase in the duration of interim assessment of students with disabilities and special needs in relation to the established duration

Format of the interim assessment of academic performance within the scope of the discipline for students with disabilities and special needs is selected taking into account individual characteristics (orally, by writing on paper, by typing on a computer, as a test, etc.). The duration of the interim assessment in relation to the established duration is increased at the written application of the student with disabilities. Time limit for the student's preparation for the test is increased by at least 0.5 hours

6. STAFFING REQUIREMENTS OF THE DISCIPLINE

Academic teaching personnel that ensure the implementation of the discipline education process meet the requirements of the Federal State Educational Standard of Higher Education for the 31.05.03 Dentistry for international students (in English) specialty; list of the aforementioned personnel is available on the website of the educational organization.

