Methodological guidelines
for the discipline (module)

Б1.О.09 Mathematics and Physics

Educational programme / specialty 31.05.01 General medicine

Specialization General Medicine (in a foreign language)

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Methodological Guidelines for students on mastering the discipline Б1.О.09 Mathematics and Physics were reviewed and approved at the Higher Mathematics and Physics Department meeting dated «____»_____202__, record no. _____.

General provisions

The purpose of the present guidelines is to provide students with a well-organised learning process, including various self-study activities.

Mastering the discipline requires both in-class learning and self-study work. In-class learning includes lectures and seminars. In-class learning is specified in the programme curriculum and discipline (module) syllabus.

First, it is recommended to review the discipline (module) syllabus, its structure, contents and assessment methods prior to starting the training.

While reviewing the syllabus, pay attention to the following:

- Some topics and units are not covered during lectures, instead students are required to do self-study according to the recommended list of main and supplementary literature and educational and methodological manuals;
- Covered theory, methodology, and formulas included in the self-study topics and units should be self-assessed according to self-check questions;
- The content of self-studied topics is integrated in the formative and interim assessment.

Each discipline (module) syllabus is accompanied by methodological materials.

Some educational and methodological manuals for the discipline (module), such as study aids or lecture notes, guidelines to laboratory work and case study, etc., can be found on MAU Electronic Information and Educational Environment (LMS Moodle).

Students are also suggested to get educational literature needed for all types of in-class learning, as well as self-study work, from MAU library.

Types of academic work, scheduled deadlines, as well as assessment system are compiled in the discipline (module) checklist.

Table 1. Formative and interim assessment checklist of the discipline (module)
"Mathematics and Physics"
(interim assessment – credit)
Year 1 / Semester 2

№	Milestones	Credit points		Assessment period (weeks)
		min	max	
Formative assessment				
1.	Home assignments	22	36	during the semester
2.	Tests	15	24	during the semester
3.	Final test	23	40	test period
	In total for semester	min - 60	max - 100	
Interim assessment "credit"				
	In total for the discipline	**min – 60**	**max - 100**	

Table 2. Formative and interim assessment checklist of the discipline (module)
"Mathematics and Physics"
(interim assessment – credit)
Year 2 / Semester 3

№	Milestones	Credit points		Assessment period (weeks)
		min	max	
Formative assessment				
1.	Interim tests	15	24	during the semester
2.	Laboratory work	11	18	within lab work schedule
3.	Laboratory work presentation	11	18	within lab work schedule
4.	Final test	23	40	test period
	In total for semester	min - 60	max - 100	
Interim assessment "credit"				
	In total for the discipline	**min – 60**	**max - 100**	

Mastering the discipline (module) requires a systematic approach. It is necessary to regularly attend lectures, actively participate in class discussions, do written assignments, study lecture notes, and devote time and effort to self-study on the discipline (module) to successfully learn theoretical material on the discipline.

To successfully complete the discipline (module), students should independently manage the study load according to the study schedule.

1. Guidelines to lectures

Lectures and similar sessions are presentations of study material given by a lecturer.

A lecture is a presentation of educational material, usually of a theoretical nature, by the teacher. The purpose of lectures is to provide students with knowledge essential to the discipline (module).

Sometimes lectures represent the main source of information, e.g. with the absence of textbooks and educational manuals; when new scientific data on a topic is not covered in textbooks; some chapters and topics are very difficult for self-study.

During lectures, it is advisable to take notes.

The following aspects should be noted most accurately and in detail during the lecture: title; outline; reference sources on the topic; concepts, definitions; key formulas; diagrams; principles; methods; theories; hypotheses; estimates; conclusions and practical recommendations.

Lecture notes are not a copy of a lecture but the representation of its main idea. The notes are written for later reading, meaning that they should be made in such a way that they can be easily and quickly read after some time. Notes help to understand and retain information.

It is recommended to ask the lecturer follow-up questions to deepen the understanding of the theoretical concepts and clarify controversial issues. When preparing for seminars, students can finish the lecture notes by adding relevant ideas from the studied literature indicated in the discipline's syllabus.

Lecture topics are listed in the discipline's syllabus.

2. Guidelines to preparing for practical classes

Practical classes are designed for students to work on one or more practice assignments under the guidance of a teacher. While lectures mainly focus on the theoretical part of a course, practical classes teach methods of theory application. The main goal of such classes is to acquire methods of theory application and skills necessary to complete subsequent courses.

Preparation for a practical lesson should begin right after a lecture on the topic or consultation with a teacher. It is necessary to identify relevant reading for the class and review it. Students should comprehend theoretical problems, connect them with real life and possible ways of their implementation.

3. Guidelines to preparing for laboratory work

Laboratory work is an activity during which students master specific methods of studying the discipline, learn experimental ways of analysing reality, and the ability to work with modern equipment. In preparation for laboratory work, it is necessary to: study or review lecture material on the relevant topic; study materials of educational and methodological guidelines on a given topic, paying special attention to calculation formulas; when performing home calculation tasks, study and repeat typical tasks performed in-class.

If necessary, ask the teacher for advice.

4. Group and one-to-one office hours

Office hours are offered:

- to address in detail some practical issues that were insufficiently covered or omitted in lectures;
- to advise on self-study (writing reports, essays, tests, calculation and graphic papers, course papers (projects), preparing for interim assessment, participating in a conference, etc.);
- to assist students in addressing controversial or difficult issues within the discipline (module).

Before attending office hours, think carefully about the issues that require clarification. If you have difficulty understanding theoretical material, you need to specify which of the points you failed to understand.

If you have difficulty solving a problem or preparing a laboratory work report, indicate the stage of the problem you cannot solve or the requirement you cannot fulfil.

5. Guidelines to organizing self-study

Successful competencies development formed by the discipline (module) implies efficient use of time for self-study work.

Self-study is a way of learning that involves studying alone under the instructor’s assignment, guidance, and observation. Students possessing self-study skills get a better and

deeper knowledge of the study material, are better prepared for creative work, self-education and continuing education.

Self-study work can be both in-class and out-of-class. The types of self-study work often overlap.

In-class self-study is done during learning sessions under the teacher's assignment. It includes:

-individual tasks;

- tests, practical and laboratory work;

- problem solving, drawing up images (such as schemes, diagrams, tables, etc.)

- reviewing reference, methodological, and special literature;

- writing a report on performed work;

- preparing for a discussion, completing tasks in a role-play simulation, etc.

Out-of-class self-study (in the library, in the laboratory, at home, in self-study rooms, etc.) is obligatory (according to the syllabus) and it does not involve immediate and constant guidance from the teacher.

It includes:

- preparation for in-class learning sessions (lectures, seminars, lab work, etc.) and homework;

- self-studying single chapters of the discipline (module) according to the syllabus;

- reviewing the recommended list of main and supplementary literature in connection to lecture notes;

- writing reports, essays, preparing presentations, speeches, compiling glossary, etc.;

- preparing for different types of practical training and completing the tasks according to the syllabus;

- writing term papers, completing calculations;

- preparing for different types of formative, interim and final assessment, including writing and preparing for a graduation thesis defence;

- participating in research, project and creative activities within a discipline (module);

- preparing for competitions, Olympiads, conferences, work in student scientific associations and clubs;

- other types of self-study.

The syllabus of the discipline, practical training, final assessment programme determine the contents of self-study work. The assignments for self-study have scheduled deadlines.

Any type of self-study includes the following steps:

1. Setting the goal.

2. Specifying a learning (problem or practical) objective.

3. Self-assessing your preparedness to work independently on an assigned or selected objective.

4. Selecting a course of action to address the objective.

5. Planning (independently or with the instructor) self-study to address the solution.

6. Following the self-study plan.

7. Checking the progress of self-study, assessing the results.

8. Reflecting on your study performance.

Reviewing scientific and educational literature

Reviewing educational and scientific literature is the keynote of self-study; it is necessary to read for seminars, quizzes, tests, and "credit" assessments.

While reviewing educational and scientific literature, students can:

- make a short or detailed outline (make a list of the main issues);
- summarise (cite the most important information from an article or monograph, make a short summary of the key ideas expressed by the author);
- make abstracts (a short summary of the main issues);
- make notes (detailed information).

Upon selecting the appropriate source, students should find the relevant chapter in the contents or index, as well as related lecture notes or chapter from a textbook. In case understanding the educational material is difficult, students may refer to other sources that may cover the issue more clearly. It should be noted that the skill of reviewing literature helps to gain better knowledge within a discipline and becomes a part of being a professional practitioner.

Preparing for tests

The purpose of a test is to assess students' knowledge of the theoretical material on the discipline (the content and scope of general and special concepts, terms, factors, and mechanisms) and the development of educational skills.

Tests also let students control their level of knowledge, identify knowledge gaps and address them. Tests include key questions on theoretical and practical foundations of a discipline (module).

To prepare for testing students should:

- review the material on the discipline;
- learn the details of testing in advance: how many tests you will need to take, how much time is allotted, the result assessment system, etc.

To successfully take a test, students should:

- carefully and fully read the questions and the given answers, choose the correct one(s) (there may be several correct answers);
- use different approaches to complete the tasks (this allows you to find the solution flexibly and effectively);
- skip "difficult" questions on the first pass, go back to them later;
- leave time to double-check the answers to avoid any errors.

Typical test tasks can be found in the assessment materials on the discipline (module).

6. Control work completion

Control work is one of the forms of testing and assessing acquired knowledge, as well as obtaining information about the level of independence and activity of students. Specific forms of course work, a list of control tasks, and design requirements are posted in LMS Moodle.

The control work is suggested after studying a certain section (sections) of the discipline and is a written work completed in accordance with the assignments.

Completing the control work allows you to master the relationships between concepts or individual sections of a topic, consolidate theoretical knowledge, and develop a willingness to use individual abilities to solve professional and research problems.

Stages of the control work:

1) studying lecture notes that cover the material, the knowledge of which is tested by the control work;

2) study of additional literature, which specifies the content of the knowledge being tested;

3) compiling answers to the questions posed in the control work.

7. Guidelines to preparing for interim assessment

Б1.О.09 "Mathematics and Physics" discipline (module) ends in “credit” assessment according to the syllabus.

The interim assessment aims at checking the final outcomes of completing the discipline (module).

The “credit” assessment supposes competence development based on the results of formative assessments within the discipline (module) in accordance with the checklist.

Students receiving the sufficient number of credit points within the course get a “pass”.

“Credit” discipline means preparing for in-class learning and out-of-class formative assessment.

To prepare for the examination, it is suggested:

- to study the list of questions attentively and determine what resources may give the required data to answer the questions;
- to read the recommended literature attentively;
- to make brief notes of the answers (answer plans).

While reviewing the material, it is recommended to use a limited amount of literature sources. The main source for examination preparation is the lectures notes. It is suggested to learn the terminology and categories because these contain the characteristics that help understand their nature and differentiate them from other terms. While preparing, students should pay attention not only to their memorization, but also to the degree of understanding of these categories and real professional problems. Preparation for the examination should be aimed both at memorizing and understanding the educational material equally. During this period, communication between students and teachers, either in group or individually, may be useful.

Examination card preparation should begin with what you remember best. However, when preparing for a particular question, keep writing notes on other questions that come to your mind.

During the exam, students may use the syllabus, as well as reference literature, with the permission of the examiner.

After completing the answer, the examiner may ask the student additional and clarifying questions.

The student's desire to present various points of view on the issue under consideration, express their attitude to it, and apply theoretical knowledge to modern problems is welcomed.