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Institute of Fundamental Medicine and Biology

**Guidelines for substantive work
of students
of the Institute of Fundamental
Medicine and Biology**

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The educational and methodical manual is intended for students of the Institute of Fundamental Medicine and Biology as a guide for organizing independent work in the performance of laboratory and practical work, preparing and writing abstracts, studying the theoretical foundations of disciplines, classroom and extracurricular independent work, writing course and final qualification papers in areas and specialties.

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Explanatory note

In connection with the introduction into the educational process of the Federal State Educational Standard, the task of organizing independent work of students is becoming ever more urgent. Independent work is defined as an individual or collective educational activity, carried out without the direct supervision of the teacher, but according to his tasks and under his supervision.

Independent work of students is one of the main forms of out-of-class work in the implementation of curricula and programs.

Independent work is cognitive educational activity, when the student's sequence of thinking, his mental and practical operations and actions depends and is determined by the student himself.

A student in the learning process should not only master the curriculum, but also acquire the skills of independent work. The student is given the opportunity to work more independently during study than to students in secondary school. The student must be able to plan and carry out his work.

The purpose of independent work of students is mastering of fundamental knowledge, professional skills and skills of activity in terms of profile, experience of creative, research activity.

Independent work of students promotes development of independence, responsibility and organization, creative approach to solving problems of educational and professional level.

Stages of independent work:

- awareness of the learning task, which is solved with the help of this independent work;
- familiarization with the instruction on its implementation;
- implementation of the work process;
self-examination, self-control;
- checking the work of the student, highlighting and analyzing the typical advantages and mistakes.

Independent work of students is an obligatory component of the educational process for each student and is determined by the curriculum. When determining the content of independent work of students, one should take into account their level of independence and requirements to the level of independence of graduates in order to achieve the required level during the period of training. So, the specific weight of independent work at the full-time department is up to 50% of the number of class hours devoted to studying the discipline, in the correspondence department the number of hours allocated for the development of the discipline increases to 90%.

Forms of independent work of students are determined when developing working programs and educational methodological complexes of disciplines in the content of the academic discipline.

According to the Regulation on the organization of independent work of students on the basis of a competence approach to the implementation of professional educational programs, types of tasks for independent work are:

- for mastering knowledge: reading the text (textbook, primary source, additional literature), drawing up a text plan, graphical representation of the text structure, text notes, extracts from the text, working with dictionaries and reference books, familiarization with normative documents, teaching and research work, use of audio - and video recordings, computer equipment and the Internet, etc.

- to consolidate and systematize knowledge: work with the lecture notes, text processing, repeated work on the teaching material (textbook, primary source, additional literature, audio and video recordings, drawing up a plan, compiling tables to systematize the training material, answer to test questions, , analytical processing of the text (annotation, reviewing, abstracting, summary analysis, etc.), completion of auditory practical works and processing reports on them, preparation of multimedia with Communication / reports to speak at the seminar (conference), materials, presentations, prepare reports, compiling bibliographies, thematic crosswords, tests, etc.

- for the formation of skills: the solution of problems and exercises on the model, the solution of variational tasks, the implementation of drawings, schemes, the implementation of calculations (graphic works), the solution of situational (professional) tasks, preparation for business games, design and modeling of various types and components of professional activity, experimental work, reflexive analysis of professional skills using audio and video equipment, etc.

Independent work can be carried out individually or by groups of students depending on the purpose, scope, specific themes of independent work, level of complexity, level of students' abilities.

Control of the results of independent work of students can be carried out within the time allotted to compulsory classes on discipline and out-of-class independent work of students in discipline, can take place in written, oral or mixed form.

When studying the disciplines of the Institute of Fundamental Medicine and Biology, the following types and forms of independent work of students are practiced:

- performance of laboratory and practical works;
- registration of reports;
- preparation of reports and information messages on assigned topics;

- preparation and writing of abstracts;
- completion of practical work;
- creating a presentation material;
- preparation for oral interview, for discussion;
- preparation for testing;
- preparation for writing, testing, testing, control point;
- preparation for the colloquium;
- the formation and implementation of a creative task, including a situational task;
- writing a course work;
- writing an essay on a given topic, etc.

Independent work is closely connected with control (control is also considered as the final stage of performing independent work), when choosing the type and form of independent work, a form of control should be taken into account.

Forms of control in the study of disciplines IFMiB:

- oral interview;
- business game;
- discussion;
- colloquium;
- control work / writing;
- check Point;
- course on discipline;
- scientific report;
- report;
- paperwork;
- presentation;
- creative task (including situational tasks);
- testing;
- essay;
- oral interview;
- essays, etc.

Independent work is carried out in the form of preparatory exercises for the mastering of new exercises in the study of new material, exercises in the process of fixation and repetition, exercises of testing and control works, as well as for self-control.

For the organization of independent work the following conditions are necessary:

- readiness of students for independent work;

- availability and accessibility of the necessary teaching and reference materials;

- consulting assistance.

Independent work can take place in a lecture room, laboratory, vivarium, computer room, library, at home. Independent work trains will, brings up efficiency, attention, discipline, etc.

Methodical recommendations for the organization of independent work of students

Independent work is one of the types of educational activities of students, contributes to the development of independence, responsibility and organization, a creative approach to solving problems of educational and professional level.

Independent work is carried out with the purpose:

- systematization and consolidation of theoretical knowledge and practical skills of students;
- deepening and expanding theoretical knowledge;
- formation of skills to use special literature;
- development of cognitive abilities and activity of students: creative initiative, responsibility and organization;
- formation of independence of thinking, abilities for self-development, self-improvement and self-realization;
- development of research skills.

Auditor independent work on the academic discipline in the training sessions under the direct supervision of the teacher and on his instructions. Extra-independent independent work is performed on the instructions of the teacher without his direct participation.

Types of tasks for out-of-class independent work, their content and character can have a varied and differentiated character, take into account the specificity of the studied discipline, the individual traits of the student.

Control of independent work and evaluation of its results is organized as a unity of two forms:

self-control and self-evaluation of the learner;

- monitoring and evaluation by the teacher.

Organization and management of independent self-study

Independent independent work on discipline is carried out at training sessions under the direct supervision of the teacher and on his instructions.

The main types of independent self-study work are:

- performance of laboratory and practical work on instructions; work with literature and other sources of information, including electronic ones;
- self-and mutual verification of completed tasks;
- solving problem and situational problems.

The implementation of laboratory and practical work is carried out in laboratory and practical classes in accordance with the schedule of the educational process. To ensure independent work, teachers develop methodological guidelines for performing laboratory / practical work.

Work with literature, other sources of information, incl. electronic can be implemented in seminars and practical classes. These sources of information can be submitted on paper and / or electronic media, including the Internet. The teacher formulates the purpose of working with this source of information, determines the time for the development of the document and the form of reporting.

The self and mutual verification of the completed tasks is more often used in a seminar, practical lesson and has as its goal the acquisition of such skills as observation, analysis of the answers of fellow students, comparison of their own results with standards.

Solving problematic and situational problems is used at lecture, seminar, practical and other types of activities. The problem / situational task should be clearly worded, questions should be posed to it, the answers to which must be found and justified. Criteria for assessing the correctness of the solution of the problem / situation problem should be known to all trainees.

Organization and management of extracurricular independent work

Out-of-school independent work is performed on the instructions of the teacher, but without his direct participation.

When submitting types of assignments for non-auditing independent work, it is recommended to use a differentiated approach to the level of preparedness of the student. Before performing an out-of-class independent work, the teacher conducts consultations with the definition of the purpose of the assignment, its content, timing of implementation, the estimated volume of work, the basic requirements for work results, evaluation criteria, forms of control and a list of literature. During the consultation, the teacher warns about possible typical mistakes that occur during the task.

To provide methodological support and guidance to independent work in an educational institution, manuals and methodological recommendations for independent preparation for various types of classes (seminary, laboratory,

practical, etc.) are developed, taking into account the specialty, the academic discipline, the characteristics of the student contingent, the volume and content of independent work, forms of control, etc.

Independent work can be carried out individually or by groups of students, depending on the purpose, scope, specific subjects of independent work, the level of complexity, the level of preparedness of students.

The types of tasks for out-of-class independent work can be:

- for mastering knowledge: reading the text (textbook, primary source, additional literature); drafting a text plan; graphic image of text structure; text summary; extracts from the text; work with dictionaries and reference books; educational and research work; use of audio and video recordings, computer equipment and Internet resources, etc .;

- to consolidate and systematize knowledge: work with a lecture summary (text processing); repeated work on the educational material (textbook, primary source, additional literature, audio and video recordings); drawing up a plan and theses of the answer; compilation of tables, puzzles, crossword puzzles, glossary for the systematization of educational material; the study of dictionaries, reference books; answers to control questions; analytical processing of the text (annotation, reviewing, abstracting, content analysis, etc.); preparation of messages for the speech at the seminar, conference; preparation of abstracts, reports; compiling a bibliography, assignments in a test form, etc .;

- for the formation of skills: solving problems and exercises on the model; solution of variational problems and exercises; drawing up schemes; solution of situational production (professional) tasks; preparation for business and role games; designing and modeling of different types and components of professional activity; preparation of presentations, creative projects; preparation of course and final works; Experimental work; designing and modeling of different types and components of professional activity, etc.

To provide an out-of-class independent work on discipline, the teacher develops a list of tasks for independent work that is necessary for the effective management of this type of educational activity of students.

The teacher carries out the management of independent work, regulates its volume for one training session and monitors the performance of all the training groups. For convenience, the teacher can keep a record of the performance of independent work, which allows you to monitor the fulfillment of the minimum of tasks necessary for admission to the final certification of the discipline.

In the process of independent work the student acquires the skills of self-organization, self-control, self-management and becomes an active independent subject of educational activity.

The learner independently determines the mode of his out-of-class work and the measure of work spent on mastering knowledge and skills for each discipline, performs extracurricular work according to an individual plan, depending on his own preparation, time budget and other conditions.

Every day the student should devote to performing an out-of-class independent work on average not less than 3 hours.

When performing an out-of-class independent work, the student has the right to apply to the teacher for advice in order to clarify the task, the form of control of the completed task.

Control over the results of non-audit independent work of students can be conducted in written, oral or mixed form with the presentation of the product of the student's activity. As forms and methods of control of out-of-class independent work, credits, testing, self-reports, control works, protection of creative works, etc. can be used.

Methodical recommendations for practical and workshops

Seminar is a kind of training sessions, where as a result of preliminary work on the program material of the teacher and students, in the context of their direct and active communication, the tasks of cognitive and educational character are solved.

The purpose of this form of training is an in-depth study of the discipline, the consolidation of the material covered, and the mastery of the methodology of scientific cognition. An important advantage of the seminars is the formation of skills of professional discussion. In addition, in such classes it is easy to see how the material is learned, what questions and objections the audience has.

In the teaching and educational process, the seminar classes perform a variety of tasks, in particular:

- stimulate regular study of program material, primary sources of scientific literature;
- consolidate the knowledge gained during listening to lectures and during independent work;
- enrich with knowledge thanks to the speeches of comrades and the teacher in the class, adjust the previously acquired knowledge;
- promote the transformation of knowledge into solid personal beliefs;
- Inoculate oral presentation skills on theoretical issues, teach them to freely operate with concepts and categories;
- provide an opportunity for the teacher to systematically monitor both the independent work of students and his work.

At the seminar sessions, students and the teacher are united in one general process of its preparation and conduct. For students, the main task is to learn the content of the educational material of the topic, which is submitted for discussion, to prepare for the presentation and discussion. In addition to his own preparation for the seminar, the teacher should provide effective methodological assistance to students.

The teacher makes a work plan for the seminar, which reflects the following issues: the purpose of the lesson, the topics of the reports (messages) and literature for their preparation, a list of additional problem questions, tasks and exercises, a list of the technical means of instruction used.

The seminar begins with the introductory words of the teacher (5-7 minutes), in which the theme of the seminar is sounded, attention is drawn to the key problems for discussion, the procedure for conducting the lesson is indicated.

The most important part of the seminar is the discussion of issues or a report. Depending on the form of the lesson, the teacher, having formulated the first question, proposes to make a wish or to make a message prepared in advance by the students. The effectiveness of the seminar largely depends on the content of speeches, reports, abstracts of students. Therefore, it is important for the teacher to determine to them the requirements, which must be sufficiently clear and at the same time not so regulated, to constrain the creative thought of students.

The order of the workshop can be very diverse, depending on its form and the goals that are set before it. But in any case, it is necessary to create on it an atmosphere of creative discussion, a lively, interested exchange of opinions. However, the discussion is not an end in itself. It is useful if it contributes to the deep assimilation of the issue under discussion. During the seminar it is important that students listen attentively and critically evaluate the performances of comrades. The head of the seminar should not immediately make comments after the student's speech. It is better to give this opportunity to the participants of the seminar.

An important element of the seminar is the teacher's final word. It can be either general at the end of the seminar, or private - after discussing a separate issue of the seminar plan. In the closing speech at the end of the seminar the teacher:

- 1) gives an overall assessment of the class (the level of preparedness of trainees for the seminar, the activity of participants, the degree of assimilation of problems);

- 2) performs analysis and evaluation of performances, while observing objectivity and exclusive correctness;

3) briefly disclose issues that have not received in-depth coverage at the seminar;

4) gives an assignment for further work.

The successful conduct of seminars is largely due to the choice of the most rational form of their conduct.

Requirements for students' speeches

One of the conditions ensuring the success of seminars is the set of specific requirements for speeches, reports, abstracts of students. These requirements should be sufficiently clear and at the same time not so regulated, to constrain creative thought, to impose schematism.

The list of requirements for any student presentation is approximately as follows:

- communication of the speech with the previous topic or issue;
- disclosure of the essence of the problem;
- methodological significance for scientific, professional and practical activities.

The most important requirements for students' speeches are independence in the selection of factual material and analytical attitude to it, the ability to consider examples and facts in the interconnection and interdependence, to select the most significant of them.

The examples and facts provided by the participant of the seminar should be significant, if possible, with the profile of the training. Examples from the field of science close to the future specialty of the student, from the sphere of knowledge, training are encouraged by the head of the seminar. The speech of the student must meet the requirements of logic. A clear identification of the problem presented, its precise formulation, the rigorous consistency of the argumentation of precisely this problem, without undue deviations from it in the process of substantiation, unconditional proof, consistency and completeness of reasoning, correct and meaningful use of concepts and terms.

Discussion of reports and speeches

The order of the workshop can be very diverse, depending on its form and the goals that are set before it.

Usually the following sequence takes place:

- a) presentation (report) on the main issue;
- b) questions to the speaker;
- c) discussion of the contents of the report, its theoretical and methodological merits and shortcomings, additions and comments on it;
- d) the final word of the speaker;
- e) the conclusion of the teacher.

Of course, this is only a general scheme, which can include the deployment of a discussion on the issue that has arisen and other elements.

In the abstract-report form of the seminar, the previously appointed speakers are the first to receive the floor, and with an extended conversation, they want to speak. The principle of volunteer performances is combined with the challenge of students. The remaining wishing to speak on the main issue, so as not to quench their interest in the seminar, you can be advised to be ready to analyze the speeches of comrades in the group, for additions and comments.

It is desirable that the student expounded the material freely.

Teacher, if possible, do not interrupt the student's speech with his comments and comments. A tactful correction of an incorrectly pronounced word, erroneous accent, etc. is permissible. If the speaker has made mistakes later, it is much better, if not the teacher himself, and the other participants of the seminar will first make a corresponding remark to him.

The situation in the audience during the speaker's speech is constantly in the focus of the head of the seminar. Seeking an attentive and analytical attitude of students to the performances of comrades, the head of the seminar informs them in advance that he evaluates a meaningful analysis of the speech, report or abstract as highly as a presentation with a good report.

The questions to the lecturer are asked first of all by the students, not by the teacher, in what they should be encouraged. It is necessary to demand that the questions asked to students are significant, related to the topic, accurately formulated. Teacher questions usually have the following requirements:

- clarity and clarity of formulations, certain boundaries, weight of the semantic load;

- the appropriateness of posing the question at the moment, the sharpness of its sounding in the current situation, evoking the lively interest of the student audience;

- Questions should be feasible for students.

By their nature, questions are speculative, suggestive, counter-intuitive; another category of issues, for example, mundane, can contain the prerequisites of different judgments, be an example or a position that includes an apparent or actual contradiction.

Clarifying questions are aimed at making the student more clearly express an idea, clearly and definitely formulate it to establish whether he has made a reservation or an incorrect interpretation of the problem. The answer allows the teacher to make the right decision: the amended reservation removes the question, the erroneous opinion is brought to the discussion of the seminar participants, but without underscoring its error.

Leading or guiding questions have the task of introducing polemics in the right direction, preventing unwanted deviations from the essence of the problem. It is important that such issues open up new areas of application of the stated provisions, expand the thinking horizon of students. Leading questions at the university seminar are a rarity and are put only in exceptional cases.

Counter-points contain requirements for additional arguments, as well as formal and logical analysis of the speech or its individual provisions. The purpose of such questions is the formation of students' ability to comprehensively and profoundly substantiate the positions put forward, the ability to discover logical errors that led to the inconclusive or doubtfulness of the conclusion.

Occasional questions are offered to the student or to the whole group in those cases when in the presentation, the report the problem is covered in general, but too schematically, everything seems clear and simple (although the true depth of the problem is not disclosed) and a "vacuum of interests" is formed in the audience. There is a need to show that in the problem presented, not everything is as simple as it may seem. If possible, relying on knowledge already known to students, the teacher will find a more complex aspect of the problem and will present it for discussion in the form of a question. The purpose of such questions is to make the complex, contradictory phenomenon of real life, containing the prerequisites for different judgments, be understood by students in the light of the discussed theoretical problem, so that the student learns to think more broadly and deeper.

The question can be put on a purely theoretical level, but specific cases, events, if possible close or well-known to the participants of the seminar, can be mentioned and an opportunity to comment on them in terms of the theoretical problem discussed at the seminar is given.

The questions that pursue the creation of a "situation of difficulties" usually represent two or three contradictory formulations, from which it is necessary to discover and substantiate the true, or take the statement of an author (without specifying his surname) for analysis. In general, the nature of such issues coincides with the formulation of problems on the independence of thinking.

Methodical recommendations for studying theoretical foundations of disciplines

The study of the theoretical part of the disciplines is designed not only to deepen and consolidate the knowledge gained in the classroom, but also to promote students' creative skills, initiatives and organize their time.

Self-study in the disciplines includes:

- reading by students of recommended literature and assimilation of the theoretical material of the discipline;
- acquaintance with Internet sources;
- preparation for various forms of control (tests, control and writing, colloquiums);
- preparation and writing of abstracts;
- performance of control works;
- preparation of answers to questions on various topics of the discipline in the order in which they are presented.

Planning the time required for the study of disciplines, students are best to carry out the entire semester, while providing for a regular repetition of the material.

The material summarized in the lectures should be regularly reviewed and supplemented with information from other sources of literature that are presented not only in the curriculum, but also in periodicals.

When studying the discipline, it is first necessary to read the recommended literature for each topic and to compile a brief outline of the main provisions, terms, information that require memorization and which are fundamental in this topic for mastering the subsequent topics of the course. To increase knowledge of discipline, it is recommended to use Internet resources; conduct searches in various systems and use the materials of sites recommended by the teacher.

When preparing for the control / writing work, it is necessary to read the relevant pages of the main textbook. It is also desirable to read additional literature. When writing a test paper, the answer should be illustrated by diagrams.

When doing an independent work on writing an essay, the student must: read the theoretical material in the recommended literature, periodicals, on Internet sites; creatively rework the studied material and submit it for the report in the form of an abstract, illustrated with diagrams, diagrams, photographs and drawings.

The texts of control / written papers and abstracts should be clearly stated in a simple and clear language.

When answering the exam, it is necessary: to think over and clearly state the material; to define the basic concepts; give a brief description of the phenomena; give examples. The answer should be illustrated by diagrams, figures and graphs.

Methodical recommendations for implementation laboratory and practical work

Laboratory work is the carrying out by students on the instructions of a teacher or by instruction of experiments using instruments, using tools and other

technical devices, i.e. This is the study of any objects, phenomena with the help of special equipment.

Practical work is conducted after the lectures, and they have explanatory, generalizing and consolidating character. They can be held not only in the classroom, but also outside the school.

In the course of laboratory and practical work, students perceive and comprehend the new teaching material. Practical exercises are systematic, regularly following each lecture or two or three lectures.

Laboratory and practical work is carried out according to the schedule of the educational process and independent work of students in the disciplines. At the same time, the principle of individual performance of works is observed.

Each student conducts a workbook, the design of which must meet the requirements, the main of which are as follows:

- on the title page indicate the subject, course, group, subgroup, surname, name, patronymic of the student; Each work is numbered in accordance with the guidelines, indicate the date of the work;

- Completely write down the title of the work, the purpose and principle of the method, briefly characterize the course of the experiment and the object of research;

- if necessary, lead the installation drawing; the results of the experiments are recorded in the form of drawings with obligatory signatures to them, as well as tables or described verbally (the nature of the design of the work is usually indicated in the guidelines for independent work);

- at the end of each work draw a conclusion or conclusion, which are discussed when summarizing the lessons.

All primary records must be made in the notebook during the experiment.

The carrying out of laboratory and practical works includes the following stages:

- setting the topic of classes and defining the tasks of laboratory and practical work;

- determination of the order of laboratory-practical work or its separate stages;

- direct performance of laboratory / practical work by students and control over the course of classes and observance of safety precautions;

- summing up the results of laboratory and practical work and formulating the main conclusions.

When preparing for laboratory exercises, it is necessary to study in advance the methodological recommendations for its conduct. Pay attention to the purpose of the lesson, the main questions for the preparation for the lesson, the content of the topic of the lesson.

The lab session is held in the form of a dialogue - the analysis of the main issues of the topic. Also, a lab session can take place as a presentation of presentations, demonstrative material (in particular posters, slides), which are accompanied by a conversation between the teacher and students.

A student can take laboratory and practical work in the form of writing an essay, preparing slides, presentations and then protecting him, or he can write an abstract in a notebook, answering questions on a given topic. Answers to questions can be accompanied by drawings, diagrams, etc. with the use of additional literature, which should be indicated.

To check the academic activity and the quality of the student's work, the teacher periodically checks the workbook.

To laboratory and practical work, the student is allowed only after a safety briefing. The safety regulations are set out in the instructions, which must be in a prominent place in the laboratory.

Methodical recommendations for the implementation of abstracts

The abstract provides for in-depth study of the discipline, promotes the development of skills of independent work with literary sources.

Abstract - a summary of the written content of scientific work on the topic. This is an independent research work, where the student reveals the essence of the problem being studied with elements of analysis on the topic of the essay. He brings different points of view, as well as his own views on the problems of the topic of the essay. The content of the abstract should be logical, the presentation of the material should be problem-thematic.

Requirements for the design of the essay:

The volume of the abstract can fluctuate within 15-20 printed pages. Main sections: table of contents (plan), introduction, main content, conclusion, list of literature.

The abstract should contain the following sections:

- title page with the indication: the name of the university, the department, the topic of the abstract, the author's full name and full name of the instructor-curator.
- introduction, relevance of the topic.
main section.
- conclusion (analysis of the results of literary search); conclusions.
- Bibliographic description, including Internet sources, issued in accordance with GOST 7.1 - 2003; 7.80 - 2000.
- a list of literary sources must have at least 10 bibliographic names, including network resources.

Textual part of the abstract is made out on the sheet of the following format:

- Spacing from the top - 2 cm; left margin - 3 cm; right spacing - 1.5 cm; the indentation from below is 2.5 cm;
- text font: Times New Roman, font height - 14, space - 1.5;
- page numbering - from the bottom of the page. On the first page the number is not set.

The essay should be performed competently with observance of the culture of presentation. There must necessarily be references to the literature used, including periodic literature in the last 5 years).

Evaluation criteria for the abstract:

- Relevance of the research topic;
- the content of the topic;
- the depth of the material;
- the correctness and completeness of the development of the issues raised;
- significance of conclusions for further practical activities;
- correctness and completeness of the use of literature;
- compliance of the abstract with the standard;
 - the quality of the message and answers to questions when defending the essay.

Methodical instructions for the performance of the test work / written work / colloquium

Test work / writing / colloquium (hereinafter referred to as work) is one of the components of the student's academic activity. It is necessary to proceed only after studying the subjects of the discipline.

The aim of the work is to determine the quality of the mastering of the lecture material and the part of the discipline intended for independent study.

The tasks facing the student in the preparation and writing of work:

1. consolidation of previously obtained theoretical knowledge;
2. development of independent work skills;
3. clarify the student's preparedness for future practical work.

Works are performed by students in the classroom, under the supervision of the teacher. The theme of the work is known and conducted on comparatively recently studied material.

The teacher prepares tasks either by options, or individually for each student. The content of the work may include theoretical material, tasks, tests, calculations, etc. Exercise is preceded by the instructor's instruction.

A key requirement in the preparation of the work is a creative approach, the ability to process and analyze information, draw independent conclusions, justify

the appropriateness and effectiveness of the proposed recommendations and solutions to problems, clearly and logically state their thoughts. The preparation of the work should begin with the repetition of the corresponding section of the textbook, textbooks on the subject and lecture notes.

Forms of intermediate, boundary and final control

According to the disciplines of the Institute of Fundamental Medicine and Biology, the following forms of monitoring students' knowledge are provided:

1. Current monitoring is conducted systematically in order to establish the level of mastery of students in the material. During the semester, in accordance with the program of the course, laboratory work is carried out and students are questioned on each topic.

2. Intermediate control is conducted to determine the quality of mastering the lecture material and part of the discipline designed for self-study. The most effective is to conduct it in writing in the form of abstracts and test tasks, compiled according to the discipline sections using special software.

Answering the tests, students will be able to systematize the knowledge gained in the process of studying the discipline in the shortest possible time, concentrate their attention on the basic concepts, formulate an approximate structure of answers to important exam questions.

The results of the interim control on the evaluation of the abstracts are recorded in the "Statement of the current knowledge control in the semester".

3. Boundary control: tests are carried out on certain topics of the educational program. The results of the control work are recorded in the "Statement of the current knowledge control in the semester".

4. Final control. To control the assimilation of this discipline an examination is provided, at which students need to answer the questions of examination tickets. The score for the exam is final at the rate and is attached in the attachment to the diploma.

Criteria for assessing the knowledge of students in disciplines

At the exam the student can get the maximum number of points - 50. The student can get the following grades with the knowledge demonstrated:

- 41-50 points - the student must accurately answer all questions presented in the ticket, as well as demonstrate the free possession of the material when answering additional questions.

- 31-40 points - the student must accurately answer the questions presented in the ticket, but not accurately or not fully disclose additional questions.
- 21-30 points - the student must answer the questions presented in the ticket, but it is difficult in the answers to additional questions.
- 11-20 points - the student finds it difficult to answer the ticket questions, answers only after leading questions, demonstrates poor knowledge in answering additional questions.
 - less than 10 points - the student showed a weak knowledge in answering the questions formulated in the ticket, did not answer any of the additional questions.
- 0 points - the student did not answer any question from the ticket. After the offer of the second (additional) ticket and the corresponding preparation for the answer also did not demonstrate knowledge of the subject. A student who fails to attend the exam without a good reason also receives a "0" score.

Creating presentations

Creation of presentation materials is a kind of independent work students on the creation of visual information aids, carried out with the help of multimedia computer program PowerPoint.

This type of work requires coordination of the student's skills in collecting, organizing, processing information, processing it in the form of a collection of materials that briefly reflect the main issues of the topic being studied, in electronic form. That is, the creation of presentation materials expands the methods and means of processing and presentation of educational information, forms students' computer skills.

Presentations are prepared by the student in the form of slides using Microsoft PowerPoint.

The role of the student:

- study the materials of the topic, highlighting the main and secondary;
- establish a logical link between the elements of the topic;
- present the characteristics of the elements in a concise form;
- select reference signals to emphasize the main information and display in the structure of the work;
- formalize the work and provide it by the deadline.

Criteria for evaluation:

- the content of the topic;
- Correct structuring of information;
- the presence of a logical connection of the information provided;
- aesthetics of design, its compliance with requirements;

- the work is submitted on time.

Not recommended:

- Overload the slide text information;
- use blocks of solid text;
- in numbered and bulleted lists use the level of enclosure deeper than two;
- use word hyphenation;
- Use inclined and vertical arrangement of signatures and text blocks;
- the slide text should not repeat the text that the teacher says aloud (viewers will read it faster than the teacher will tell, and lose interest in his words).

Approximate requirements for presentation design

Design of slides

Style	Observe the same style of design. <ul style="list-style-type: none"> • Avoid styles that will distract from the presentation itself. • The auxiliary information (control buttons) should not prevail over the basic information (text, pictures).
Background	For the background, choose colder tones (blue or green).
Using Color	It is recommended to use no more than three colors on one slide: one for the background, one for the headings, one for the text. <ul style="list-style-type: none"> • For background and text, use contrasting colors. • Pay special attention to the color of hyperlinks (before and after use).
Animation Effects	Use the power of computer animation to present information on the slide. Do not abuse the various animation effects, they should not divert attention from the content of the information on the slide.

Recommended:

- conciseness and brevity of presentation, maximum information content of the text: short theses, dates, names, terms - the main points of the supporting abstract;
- use of short words and sentences, a minimum of prepositions, adverbs, adjectives;
- the use of numbered and bulleted lists instead of solid text;
- use of the tabular (matrix) presentation format of the material, which makes it possible to present the material in a compact form and visually show the connections between different concepts;

- the implementation of general rules for the design of the text;
- careful alignment of the text, letters, list markers;
- horizontal arrangement of textual information, incl. and in the tables;
- for each position, the idea should be allocated a separate paragraph of the text;
- The main idea of the paragraph should be placed at the very beginning - in the first line of the paragraph (this is due to the fact that the first and last thoughts of the paragraph are best remembered);
- Ideally, if there is only a title, an image (a picture, a picture, a diagram, a diagram, a table, etc.) on the slide and a signature to it.

Presentation of information

Information content	Use short words and sentences. Minimize the number of prepositions, adverbs, adjectives. Headlines should attract the attention of the audience
Location of information on the page	Preferably, the horizontal arrangement of information. The most important information should be in the center of the screen. If there is a picture on the slide, the inscription should be placed below it.
Fonts	<ul style="list-style-type: none"> • For headings - not less than 24. • For information - not less than 18. • Fonts without sans are easier to read from a long distance. • You can not mix different types of fonts in one presentation. • Use bold, italic or underline to highlight information. • You must not abuse capital letters (they are read worse than lowercase letters).
Ways of information extraction	Should be used: <ul style="list-style-type: none"> • Frames, borders, fills; • different font colors, hatching, arrows; • Figures, diagrams, diagrams for illustrating the most important facts
Amount of information	It is not necessary to fill one slide with too much information: people can memorize no more than three facts, conclusions, definitions at a time. The greatest efficiency is achieved when the key points are displayed one at a time on each individual slide.
Kinds of slides	To ensure diversity, different types of slides should be used: with the text;

	with tables; with diagrams.
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Methodical instructions for the implementation of final qualification and course work

Writing a course or diploma (final qualification) work is the result of a certain stage in the student's scientific activity. The scientific competence of a student of a senior course or graduate will be appreciated by the public in many respects precisely by the quality of his qualification work, which he presents to his teachers, colleagues and, finally, to the members of the State Attestation Commission.

At Kazan University, the "Regulations for the preparation and protection of course work in the federal state autonomous educational institution of higher professional education" Kazan (Privolzhsky) Federal University ", approved by the rector. The student develops and prepares a course project (work) in accordance with the requirements of the Regulations for the preparation and protection of course work in the federal state unitary enterprise "Kazan (Privolzhsky) Federal University". 10/20/2012

According to the "Regulations ..." course work on the specialty - an independent scientific research in the direction (profile), specialty (specialization), performed by the student in accordance with the curriculum under the guidance of the teacher of the department (faculty) and serving in-depth knowledge of the selected basic educational program. Scientific research is expressed in solving some cognitive problem, correlating theoretical positions with facts, systematic presentation, operating with modern special terminology, etc. Course work in the specialty (direction) is one of the forms of student reporting on the results of training for the relevant course.

Graduation qualification work (Bachelor's, Master's, Master's) is an obligatory form of the final state certification, independently performed by the trainee at the final stage of training in the specialty (direction). In the final qualification work on the basis of professionally oriented theoretical training, specific practical tasks are provided, provided for by the corresponding stage of higher professional education. The goal of the final qualifying work is to establish the level of the graduate's preparedness for professional work. The tasks of the final qualifying work are: expansion, systematization and consolidation of theoretical and practical knowledge in the specialty and their application in professional work, improving the skills of independent creative work, the ability to clearly, clearly and logically express their thoughts on selected topics in writing.

The procedure for preparation and protection of final qualifying work is carried out according to the current "Regulations on the final state certification of graduates of the federal state autonomous educational institution of higher professional education" Kazan (Privolzhsky) Federal University "of 26.12.2011.

Competent design of scientific work implies correct representation of all its parts: title page, content, list of abbreviations, introduction, review of literature, section of materials and methods, section of results and their discussion (can be presented in two separate sections), conclusions, conclusions, list of sources used . It is also necessary to correctly draw an illustrative part of the work (tables, graphs, drawings, photographs), a section of statistical processing of the results.

The name is an important element of the work. The main advantages that it must have are shortness and clarity. It is highly undesirable to use more than 10-12 words for the title of the work. The keywords contained in the title should be placed as close as possible to its beginning. The title should more characterize the problem over which the author works, than his concrete results. When formulating a name, it is undesirable to use the words "study", "study" and their synonyms.

In the "Introduction" section, the author needs to: determine the hypothesis, provide background information, explain why he undertook research in this area, give a brief critical analysis of research in this area, show the relevance of the topic of his work, formulate the goal of the work and tasks that need to be addressed to achieve goals.

The section "Literature Review" should contain a detailed critical analysis of the world's scientific data in the field to which the author has devoted his work. The review contains information summarized for many sources, confirming the author's hypothesis and explaining the author's chosen ways of achieving the goal of the work.

Writing the section "Materials and Methods" is necessary in order for another scientist of appropriate qualifications to reproduce the study, based on the methods given in the section. This section describes the place, conditions for conducting experimental work, the object of research, the used laboratory and statistical procedures. It is necessary to indicate the limitations and assumptions of the methods used and ways to circumvent them, if this was done. A reference to literary sources without a description of the nature of the method is permissible only in those cases when the method is standard. With a combination of research approaches from several scientific disciplines, the methods should be stated in the most detailed manner. The brand and manufacturer of complex experimental and analytical equipment used in research work, as well as producers of unique substances, chemicals and software products are necessarily indicated.

The "Results" section is the main one in the work. In this section, the author gives his experimental data, which confirm the working hypothesis put forward in the introduction. The results should be saturated with illustrations that carry the main function of evidence, presenting the author's materials in a condensed form. It is important that the captions do not duplicate the text of the work. The captions should be drawn up in such a way that to understand the essence of the drawing there was no need to refer to the text of the work. The text part of the results should explain the data of the tables and figures and explain the logic of the transition to the subsequent data block or the subsequent part of the analysis. The inscriptions, digital and textual designations must be proportional to the image, the scale of measurements must necessarily be shown on the images of biological objects. Units of numerical data must be selected so that the maximum values are represented with a minimum number of zeros. All signatures, symbols and abbreviations in the figures must be deciphered in the caption.

"Discussion of results" is an absolutely necessary part of the scientific work and can constitute a separate section. If the discussion of the results is a separate section, the Results only describe the experimental data. In the "discussion" the author's experimental data should be compared with the data of the world scientific literature. Such a comparison helps to better identify the novelty of the work and its relevance. The discussion should show why the author's results are as they are, and how they relate to the basic idea of the work. This section describes the characteristic features of the author's experimental data and outlines the framework in which conclusions from the results of the work are legitimate.

Section "Conclusion" is not strictly obligatory for course and diploma papers. This section briefly compares the initial goal of the work and its concrete results. Generalization of the main results of the work is done, their significance is determined for further research.

Conclusions are compactly formulated concrete conclusions about the results of the work, corresponding to the tasks solved in the work. The number of conclusions can not be less than the number of tasks assigned.

Applications containing materials of an illustrative and auxiliary nature.

Execution of course, thesis work

The text of the course or graduate qualification work must be in the following format: font - Times New Roman, font size - 14, line spacing 1.5, margins: left - 3 cm, right - 1.5 cm, top - 2 cm, bottom 2 - see Indent the first line of each paragraph - 1.5 cm. The text should be aligned in width, hyphenation is not allowed. The volume of the course work (along with the list of used sources) should not exceed 35-45 pages, the final qualifying work - 55 pages. The decimal separator character must be "." (Dot), delimiter "," (comma) is not allowed. After the section name, the "dot" sign is not inserted. Round and square brackets are treated as a single character: a space is placed before the opening and after the closing brackets. When forming the numbered lists, including the list of sources used, the numeric index of the list item number is separated by a bracket. Pages are numbered from the second page with the page number located in the center at the bottom. Numbering of pages, like the numbering of sections of work, through. The sections "Content", "List of abbreviations", "Introduction", "Experimental part", "Conclusions", "List of used sources" are not numbered. The names of sections (but not subsections) should be written in capital letters, centered on the page and bolded. Each section begins on a new page.

All words and abbreviations in Latin in the text of the work are written in italics.

Registration of the title page

The title page of the course or final qualifying work (see samples) should have a cap, which indicates the departmental affiliation of the author of the work, indicating the number of the specialty (direction) and its code for the RCSD. On the title page of the course work, the author of the work and the scientific (scientific) leader (heads) sign their work. The title page of the final qualifying work is additionally presented to the head of the department. The name of the university, faculty, department, rank of work and its name are written in capital letters. The departmental affiliation, full name of the institution and the title of the work are bold. Bottom of the center of the title page is the territorial affiliation of the work.

Sample of registration of the title page of the specialist's term paper
THE MINISTRY OF EDUCATION AND SCIENCE OF THE RUSSIAN
FEDERATION

Kazan (Volga region) Federal University
Institute of Fundamental Medicine and Biology

DEPARTMENT OF MICROBIOLOGY

Specialty: code - name

COURSE WORK
NAME OF COURSE WORK

Student _ course

Group ____

« » _____ 20__ . _____ (II Ivanov)

Scientific leaders

Doctor of biological sciences, professor,

« » _____ 20__ . _____ (PP Petrov)

Candidate of biological sciences, assistant

« » _____ 20__ . _____ (SS Sidorov)

Kazan-20__

Sample of registration of the title page of the final qualifying work
THE MINISTRY OF EDUCATION AND SCIENCE OF THE RUSSIAN
FEDERATION

Kazan (Volga region) Federal University
Institute of Fundamental Medicine and Biology

DEPARTMENT OF MICROBIOLOGY

Specialty: code - name

EXHAUST QUALIFICATION WORK

Graduate work

JOB TITLE

Work completed:

" ___ " _____ 20__ _____ (II Ivanov)

The work is allowed to protect:

scientific adviser

degree, academic title,

position

" ___ " _____ 20__ y. _____ (PP Petrov)

Head of the department

scientific degree

" ___ " _____ 20__ y. _____ (SS Sidorov)

Kazan-20__

Registration of the list of used sources

The main document regulating general requirements and rules for compiling bibliographic descriptions is GOST 7.1-2003.

GOST 7.1-2003 establishes general requirements and rules for the compilation of a bibliographic description of a document, its part or a group of documents: a set of areas and elements of a bibliographic description, the sequence of their location, the filling and presentation of elements, the application of prescribed punctuation and abbreviations.

According to GOST, bibliographic references in the list of used sources are made out as follows:

When quoting a book by one author:

1) Skulachev, VP Energy of biological membranes [Text] / VP Skulachev; Acad. Sciences of the USSR. Section of Chemical, Technological and Biological Sciences. A series of "Biological and technical membranes". - Moscow: Science, 1989. - 564p. - ISBN 5-02-004027-4.

When quoting a book by several authors:

1) Gorbunova, VN Introduction to molecular diagnostics and gene therapy of hereditary diseases [Text] / VN Gorbunova, VS Baranov. - St. Petersburg. : Special literature, 1997. - 287p. - ISBN 5-87685-076-4.

When quoting the book of a foreign author translated into Russian:

1) Webb, L. Inhibitors of enzymes and metabolism. General principles of inhibition [Text]: [trans. from the English] / J. Leiden Webb. - Moscow: The World, 1966. - 863p. - Translation of the ed.: Enzyme and metabolic inhibitors. General principles of inhibition / J. Leyden Webb. - London: Academic press, 1963.

When quoting a section or chapter:

1) Vershinina, V. I. Technologies of biological processes [Text] / VI Vershinina // Microbial biotechnology: Textbook. Help. for high schools / IB Leshchinskaya, BM Kurinenko, VI Vershinina, TV Bagaeva [and others]; Ed. O. Ilyinskaya; Ministry of Education of the Russian Federation, Kazan State University. - Ed. 3rd, stereotyped. - Kazan: Kazan State University. IN AND. Ulyanov-Lenin, 2007. - P. 27-46.

When quoting an article from the magazine:

- 1) Vlasov, V. V. Oligonucleotides - the basis of gene-directed therapeutic preparations [Text] / VV Vlasov // Bulletin of the Russian Academy of Sciences. - 2004. - T.74. - P.419-423.
- 2) Ilinskaya, O. N. Changing the net charge from negative to positive makes ribonuclease Sa cytotoxic [Text] / O. N. Ilinskaya, F. Dreyer, V. A. Mitkevich, K. L. Shaw, C. N. Pace, A. A. Makarov // Protein Sci. - 2002. - V.11. - P. 2522-2525.

When citing dissertations:

- 1) Zelenihin, P. V. Bacterial ribonucleases as inducers of differential toxic changes in cells of different levels of organization [Text]: dis. ... cand. Biol. Sciences 03.00.07; 03.00.04. Protected on March 22, 2007 / PV Zelenihin; The Kazan. state. un-t. -Kazan, 2007. - 134 liters.

When quoting theses abstracts:

- 1) Zelenihin, P. V. Bacterial ribonucleases as inducers of differential toxic changes in cells of different levels of organization [Text]: author's abstract. dis. ... cand. Biol. Science / PV Zelenikhin; The Kazan. state. un-t. -Kazan, 2007. - 24 p.

When quoting articles from collections of abstracts of papers and conference materials:

- 1) Smolentseva, OA Effect of Nitric Oxide Lactobacillus plantarum on Surface Structures and Viability of the Producer [Text] / OA Smolentseva, DR Yarullina, DS Nalimov, OA Konovalova, O.N. Ilyinskaya // Biosystems. Organization, behavior, management: materials of the 60th scientific student conference of the Faculty of Biology, Nizhny Novgorod, April 12-13, 2007 - P. 69-70.

When citing electronic resources:

Electronic resources of local access:

- 1) The Great Encyclopedia of Cyril and Methodius, 2003 [Electronic resource]: modern universal growth. encycl. - 7 th ed., Amendments. and additional. - Electron. data. - [M.]: The big dew's. encycl., 2003. - 6 electron. opt. CD-ROM drive.

Remote access electronic resources:

- 1) Namsaraev, ZB. Microbial communities of alkaline fluids / ZB Namsaraev // Problems of evolution [Electronic resource]. - 2003. - Access mode: <http://macroevolution.narod.ru/namsaraev.htm> - Date of access: 02.02.2008.

Methodical recommendations for the preparation of the text of the qualification work and the report for its protection

When preparing the text of the qualification work (course or graduation) it is important to remember that it should be well structured. The work should not be a set of results of experiments, not connected in any way. Internal logic of work should be traced. The reader should understand why this or that element of the work was done, why the elements are arranged in the presented order, and so on. The work must necessarily begin with the formulation (at least in its most general form) of the purpose of the proposed study and the formulation of specific tasks, the solution of which is necessary to achieve the goal.

When analyzing the results of experimental work, it is extremely important to take into account the possible variability of the data obtained. To confirm the reliability of the differences obtained between the experimental and control options, it is necessary to use a set of statistical methods that is adequate to the study. Completely inadequate is the simple calculation of the mean value of a group of data and its comparison with a similar indicator for another group. Correct mathematical processing of experimental data is one of the necessary elements of the qualification work.

When drafting the text of the work, one should not get carried away by illegitimate borrowing of fragments of works by other authors without indicating the source of borrowing. The author's text should be original, even in those parts where it describes the results of the work of others (for example, in the "Literature Review" section). There is a certain number of sources that can and, often, need to be quoted verbatim. These are winged expressions, document templates, definitions, laws. Texts of qualifying works of students of the Kazan Federal University are checked for plagiarism in them. The originality of the text of qualifying work of students of the Institute of Fundamental Medicine and Biology should be at least 80%.

Protection of qualification works of students of the Institute of Fundamental Medicine and Biology takes place in one of two possible formats: poster session (for protection of course qualification works), or oral report (with the protection of graduate qualification works of bachelors, diploma theses, master's theses). The following mandatory elements should be located on the stand presented to the defense: "Name of the work", "Work executor and supervisor", "Goals and tasks of work", "Results and conclusions", "Illustrative material". If necessary, the stand can also accommodate other information on the choice of the defender.

The oral report at protection of final qualifying works of bachelors, degree works of experts, master's dissertations is accompanied by presentation with the

help of multimedia equipment. When preparing a presentation, it should be borne in mind that the report is given no more than 7 minutes and to plan the number of slides and oral presentation of their content, proceeding from this. The obligatory elements of the presentation for the oral report are: 1) a title slide with the title of the work, the names of the performer and the supervisor; 2) slide with the formulation of the purpose and objectives of the work, 3) slides with the results; 4) slide with conclusions; 5) a slide with thanks of the author of the work to persons who participated in the work, but who were not scientific supervisors. All slides must be numbered. When preparing a presentation, it is necessary to pay attention to the academic nature of its implementation, not to use animation elements without extreme necessity. The preferred color scheme for the presentation is a light background and dark contrast text.

The protection of the course work is mandatory and is carried out at the expense of the time provided for the implementation of the SIRS. The terms of protection are notified to the students in advance. Protection must be conducted no later than the middle of the last week before the session begins. To develop a stable communication and speech competence among students, it is recommended to conduct pre-defense a week before the defense.

Evaluation of course work is formed on the basis of the results of students' protection of course work before a special commission, formed at the department. The composition of the commission and the chairman of the commission is established annually by the order of the head of the department. The commission should include at least three people. Recommended structure of the commission:

- the head of the department or the person representing him, for example deputy head of the department. on SD (chairman of the commission);
- a teacher who lectures on this discipline;
- master of the student, undergraduate;
- other teachers in the field of research.

A student who defends the course work should make a report on the work done for 5-10 minutes. The report outlines the main results of the research.

When presenting the material, the student must demonstrate:

- the ability to briefly, clearly and technically correctly state the contents of the SRWS;
- the ability to justify the goal, objectives, conclusions of research,
- Possession of theoretical material on the subject of course work;
- a good knowledge of the conceptual apparatus and clearly navigate in its material.

After the message, the student answers the questions of the commission members and those present about the topic of the course work.

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