

Al-Farabi Kazakh national university
Biology and biotechnology faculty
Educational program in the specialty "5B05101 – Biological engineering"

Methodological Guide to Students' individual works (SIW) on the course
"Biophysics"
2 year, spring semester,

DATA on the teachers conducting disciplines of the module:

On discipline "Biophysics"

Instructor: Lyazzat Gumarova, PhD, professor

e-mail: Lyazzat.Gumarova@kaznu.kz

Room 434, Building #6

	Thopic	Textbook & Course Materials	Type of SIW presentation	Week	Max. Score
1	Energy of Activation, Theory of Absolute Reaction Rate	1. R.Glaser. Biophysics. // Berlin ; New York : Springer. -2001. Chapter 2. pp. 19-26 2. Tuleukhanov S, Inyushin V, Gumarova L., Shvetcova E, Kulbayeva M. Manual for laboratory classes in biological physics: methodical development. – Almaty: Qazaq university, 2016. pp 5-7.	Oral, Exercises	3	10
2	The Aqueous and Ionic Equilibrium of the Living Cell	R.Glaser. Biophysics. // Berlin ; New York : Springer. -2001 Chapter 3. pp. 127-150	Oral	6	10
3	Electric fields in organisms. Electrography	R.Glaser. Biophysics. // Berlin ; New York : Springer. -2001 Chapter 3. pp. 185-192	Oral	11	6
4	Electroconductivity of living systems	1) R.Glaser. Biophysics. // Berlin; New York: Springer. -2001. - Chapter 3.	Oral	13	6

		pp. 192-197 2) Tuleukhanov S, Inyushin V, Gumarova L., Shvetcova E, Kulbayeva M. Manual for laboratory classes in biological physics: methodical development. – Almaty: Qazaq university, 2016 – pp.84-88			
5	Biophysical Aspects of High-Frequency Field Interaction of Radio- and Microwave Electromagnetic Fields	R.Glaser. Biophysics. // Berlin; New York: Springer. -2001. - Chapter 3. pp. 298-303	Oral	15	6

Textbook & Course Materials

- 1) R.Glaser. Biophysics. // Berlin ; New York : Springer. -2001, 361 p.
- 2) Jaakko Malmivuo, Robert Plonsey. Bioelectromagnetism. // Oxford university Press, 1995
- 3) Tuleukhanov S, Inyushin V, Gumarova L., Shvetcova E, Kulbayeva M. Manual for laboratory classes in biological physics: methodical development. – Almaty: Qazaq university, 2016. – 116 p.

RULES FOR ORGANIZATION OF STUDENTS' INDEPENDENT WORK

1. Basic provisions

1. The rules set common requirements at the University for organization of students' independent work on credit system which realize professional training programs of higher and postgraduate education.

2. Students' independent work (further - SIW) is work on a specific list of themes for independent study provided with instructional literature and recommendations, which is controlled by means of tests, examinations, colloquium, abstracts, essays and reports. Depending on the group of students it is sub-divided into students' independent work (further - SIW), independent work of master degree students (further - MIW) and the independent work of doctoral student (further - DIW); the entire volume of students' independent work is confirmed by tasks that require from a student daily self work;

3. Independent work of the student under the guidance of the teacher (further- SIWP) - extracurricular student work under the guidance of the teacher, conducted according to the approved schedule. Depending on the group of students it is divided into: independent work of the student under the guidance of the teacher (further - SRSP), independent work of a master student under the guidance of the teacher (further - SRMP) and independent work of doctoral student under the guidance of the teacher (further - SRDP);

Independent work of the student is an important component of the educational process aimed at improving the quality, depth and strength of the resulting knowledge in the study of specific

subjects of the curriculum, the formation of student needs to educate themselves, self-development and self-improvement, in particular, and in the subsequent professional activity.

4. Organization of independent work of the student involves establishing its relation with different forms of organization of the educational process, namely:

- clear definition of the place of independent work of students in the study of the specific discipline;

- focus of lectures and workshops on the independent work of students; -

- choice of the form, type and method of independent work of the student;

- working out of guidelines for the implementation of tasks of students' independent work;

- a combination of independent work of students with different forms of lessons.

5. Students should be familiar with the rules of the organization of independent work and relevant norms and requirements.

6. During the independent work of the student acts as an active participant in the learning process and acquiring the skills of critical and creative thinking, the ability to argue and defend their position.

7. Types of independent work of students, their labor-intensity in hours, form and terms of control are regulated in the syllabus for each subject.

Examples of forms and types of SIWs:

1) Summary - written description of the problem with a mandatory review of the literature or an analytical description of the content of research, books.

2) Colloquium - a form of control of student's independent work carried out in the form of an interview on studied modules of a particular subject in order to determine the quality of mastering of the educational material.

3) Essay - written statement of his own opinions on the topical issues in different genres: the criticism, journalism etc.

4) Objectives tree – the task involves choosing problems identifying target on all levels; task definition at all levels, and the algorithm of their implementation; identifying ways of achieving the objectives; the choice of indexes of the quality and forms of tasks control.

5) Presentation - oral presentation on a given problem with the representation of the main points in the form of slide presentations, videos, and more.

6) Situational task - description of different situations and a list of tasks to them.

7) Business games - imitation of any process aimed at developing in students the skills necessary for future professional activity, and requiring pre-training and self-completion.

8) Group project - the task of project development by a group of 3-5 students.

9) Individual project - the task of developing a research project on a topical subject, designed for the most prepared students.

10) Glossary - a brief explanation of terms and concepts on a given topic.

8. The choice of the form and type of independent work of students in each subject is conducted in accordance with the specifics of the studied subject, its aims and objectives, the degree of complexity and relevance, level of training of the student, labor-intensity of the subject.

9. Elements of technology of independent work of students are: Planning, organizing self-study, evaluation and monitoring task fulfillment, analysis and enhancement of students' independent work.

10. Planning of students' independent work is carried out by working out corresponding educational and methodical documentation of the faculty, department, every teacher, including scheduling office hours, planning the work load of the teacher, working out of schedules of independent work.

11. Independent work is coordinated by the dean office, methodological department, the department of planning and support of the educational process, the department, the teacher conducting class work in the academic group.

12. Methodical department conducts workshops and consultations with the staff on methodical problems of students' independent work, the expertise of methodical guidelines and

recommendations on the types and forms of SIW, makes recommendations to improve the organization of SIW on the basis of analyzing the performance of students.

13. The dean's office provides:

- drawing up the optimal schedule of office hours and schedule coordination of consultations of teachers, taking into account features of class work fund;
- monitoring of schedule fulfillment of SIWs and students' performance.

14. The Department provides:

- establishing a balance between lectures, practical, laboratory classes and SIWs in accordance with the definition of credit;
- detailed structuring of the volume and content of lessons: lectures, practical classes, laboratory classes and SIWs; - development of criteria for evaluating students' knowledge on each topic separately; - fulfillment of the curriculum on the discipline in the amount prescribed by the curriculum.

15. The teacher provides:

- working out of teaching materials on the organization of the SIW and recommendations on literature; - working out requirements for the tasks fulfillment, terms and forms of control / reporting, and evaluation criteria for each task of students' independent work;
- the differentiation of independent work of students, as well as tasks according to the type and degree of difficulty.

16. The main task of the teacher in the organization of students' independent work are:

- to promote the formation of students' skills of independent study, research and practice work;
- to promote the development and deepening of the professional scientific and practical interests of students; - to contribute to the formation of professionally significant qualities, knowledge and skills of the future specialist; - to create conditions for the harmonious development of the personality of creative students.

2. Requirements for the content of students' independent work

17. The content of the students' independent work is reflected in the educational program of the subject, in the syllabus indicating the volume of independent work during the academic period, the number and character of tasks, their labor intensity and deadline of completion of self-done tasks, forms of current and intermediate control.

18. Requirements for students' independent work:

- schedule of students' independent work, calculated for the entire period of the subject; - system of tasks corresponding to the main sections of the syllabus; - the theme of essays, reports, tasks, etc.; - requirements for the content of independent work of students, their design, the recommended volume; - lists of basic and additional literature; - types of consultations; - criteria for evaluation; - deadlines of tasks.

19. Tasks of students' independent work should:

- be done personally by the student or be a self-done part of the collective work; - be a complete task fulfillment (finished version of working out), in which current problems on a particular topic and their individual aspects analyzed (topical issues of the studied subject and the appropriate sphere of practical activity); - demonstrate sufficient competence of the author in discussed issues; - have teaching, research and / or practical focus and relevance; - contain certain elements of novelty (if it is research work).

20. While accepting students' independent work it is necessary to specify the criteria for evaluation, where:

- the evaluation of the content of the work with its theme, the fullness and depth of the description, according to the goals and objectives; - the evaluation of the extent of the studied literature; - identifying the degree of independence of independent work performance; - the evaluation literacy and clarity of the material presentation; - the degree of generalization, analysis and conclusions of the work; - the evaluation of the ability to generalize the theoretical issues of the subject; - the maintenance of technical requirements for the design of the abstract; -

completeness of the responses in the defense of students' independent work; - the answers to supplementary questions; - the ability to defend their positions, etc.

21. In studying a subject, the number of students' independent works should be no more than 5 tasks in the semester.

22. Evaluation criteria of students' independent work: fulfillment of one task is evaluated estimated by points, distributed by the teacher.

23. Before the start of the academic period every student must be provided with a full package of guidelines or recommendations on the fulfillment of students' independent work on paper or electronic media, containing:

- themes, the purpose and the content of tasks; - recommended literature indicating the pages;
- reporting forms and schedule control; - criteria for evaluation.

24. In accordance with the target setting focused on the effectiveness of studying the subject, independent work can be organized as:

- Extracurricular work, where the main role is given to the student (preparation for lectures, practical and laboratory classes, writing essays and reports, presentations, problem solving, performance of other homework);
- active clasSIWom work, where the main role is given to the student and teacher. This can be a synthesis of home preparation for classes and for independent work - training, debates, role play, presentation, logic puzzles, cases, etc.

25. Control of the organization and fulfillment of students' independent work is conducted in accordance with the schedule of the chair for students' independent work and the academic calendar.

26. All types of control of the organization and fulfillment of students' independent work suggest the availability of the consultation schedule, intermediate reports, accepting assignments of students' independent work etc., control registers of students' independent work on separate subjects and courses.

27. The total amount of self-study work of the student includes student's independent work under the guidance of the teacher.

28. Percentage of students' independent work with the teacher in total students' independent work is 25-50% of the total amount of self-study work and is determined by the load of the teacher in the academic period: with the load of 1-4 credits office hours are scheduled for 1 academic hour per week, 5-9 credits - 2 academic hours, 10-15 credits - 3 academic hours per week.

29. Schedule of office hours is compiled separately from the main schedule of lessons.

30. Consultations on homework, term papers, and semester tests, reports and other tasks of students' independent work, current and final control should be conducted during the office hours.

31. The student may not be present in the clasSIWom according to the schedule office hours, if the fulfillment of the student's independent work does not cause him any difficulty.

32. The presence of the teacher in the clasSIWom during the time specified in the schedule of office hours is a must.

33. It is not allowed to replace the office hours by seminars, practical or laboratory classes.