Program of final attestation on discipline

«Bioinstrumentation»

Form and platform final control: Oral exam

1. Classify equipment and devices applied in the laboratory and indicate their application briefly.
2. Classify laboratory glassware depending on its application.
3. Classify general laboratory equipment and indicate their application briefly.
4. Briefly describe the main laboratory equipment and glassware which are required to prepare a stock solution and its further dilutions.
5. Describe the main parts in experimental protocol.
6. Give a definition of the following terms: bioinstrumentation, sample preparation, extract, dilution, stock solution.
7. Describe most common methods of protein isolation and their principle of work.
8. Describe the principles of work of single beam and double beam spectrophotometers and its application in biology.
9. Describe the operating principle of microscope and its application in biology.
10. Describe the operating principle of electrophoresis and its application in biology.
11. Describe the principles of work of of gas chromatography, and its application field.
12. Describe the principles of work of of liquid chromatography, and its application field.
13. Describe the main equipment for cultivation and fermentation of microorganisms.
14. Describe the main equipment used in microbiology.
15. Characterize the main equipment for sterilization and disinfection.
16. Characterize the main apparatus equipment for preservation and storage of biological samples.
17. Describe the main equipment for water treatment and water purification.
18. Describe the main biotechnological techniques for treating wastewater and contaminated soils.

RUBRICTOR FOR ASSESSMENT OF FINAL CONTROL AT THE FACULTY OF BIOLOGY AND BIOTECHNOLOGY

Discipline: Bioinstrumentation. **Form:** standard oral/offline**. Platform:** Univer system

Point / Criterion	DESCRIPTORS				
	Excellent	**Good**	**Satisfactorily**	**Unsatisfactory**	
	90–100 points	**70–89 points**	**50–69 points**	**25–49 points**	**0–24 points**
1. Knowledge and understanding of the theory and concept of the course	The questions are answered comprehensively, illustrated with illustrative examples where necessary; The answers are presented in competent scientific technical language, all physical and technical terms and concepts are used correctly and explained correctly.	The questions were generally answered correctly, but individual inaccuracies that are not of a fundamental nature. Not all physical and technical terms are used correctly; there are some incorrect statements and grammatical/stylistic errors in presentation. The answers are not adequately illustrated with examples.	The answers to the questions are fragmentary, correct conclusions alternate with incorrect ones. The content blocks of the physical and technical profile, necessary for a full disclosure of the topic, are missing. The student is generally oriented in the subject matter of the course, but has problems with disclosing specific questions.	The answers do not correspond to the content of the questions. Key concepts for the training course contained in the questions are interpreted wrong.	There are no answers to questions; ignorance or misunderstanding by the student of more or the most important part of the educational material. Violation of the Rules for final control.
2. Application of the selected methodology and technology to specific applied problems	The technology and methodology of the course are applied with deep content, taking into account the specifics of the direction of training of students; scientific physical concepts are freely applied to the task at hand, followed by logical and demonstrative	Course methodology and knowledge gained the student is poorly integrated and adapted to solving specific practical problems proposed in the exam paper; the student's knowledge is adapted; the answers are poorly structured, the answer contains insignificant disclosure of the main problem;	The course tools are used superficially, have little content, there are inaccuracies in the answers, the logic of presentation is broken, there is no meaningfulness of the material provided, and there is no understanding of interdisciplinary connections. factual errors which he is able to correct on his own, thanks to a leading question;	Incorrectly applies the essential part of the discipline of natural science, makes significant factual errors that the student cannot correct on his own, for the most part additional questions on the content of the exam student finds it difficult to answer or does not give correct answers.	Inability to apply knowledge to solve problems and explain physical phenomena; when answering (one question), he makes more than 3-4 gross mistakes, which he cannot correct even with the help of teaching staff; did not fully understand the material. Violation of the Rules for final control.

3. Evaluation and analysis of the applicability of the chosen method to the proposed practical problem, justification of the result obtained	Having the ability to integrate, validate and analysis of methods and technology on a specific topic, structuring the answer, analysis of 5 provisions of existing theories, scientific schools, directions regarding the exam question ticket, the answers are illustrated with examples and visual materials, including from the student's own practice; demonstrates the ability to conduct dialogue and engage in scientific discussion.	Integration and analysis of the application of methods and course technology with the subsequent use of visual materials to consolidate their reasoning through the use of scientific and technical terms with the assumption of minor errors when reproducing knowledge; analysis of 3-4 provisions of existing theories, scientific schools, directions regarding the exam ticket.	Superficial justification of the laws and principles of physical phenomena, weak application of the bulk of the material in accordance with the training program with difficulties in its independent reproduction and requirement of leading questions;	Lack of validity and analysis of application methods and technology of the course, manifestation difficulties in providing answers to questions of a reproductive nature.	Lack of ability to apply the course methodology when giving examples and using visual materials; Violation of the Rules for final control.

Appendix 1 to the Rules
Template and example of calculating the final score

RUBRICTOR FOR CRITERIAL ASSESSMENT OF FINAL CONTROL
Discipline: Bioinstrumentation. **Form:** standard oral/offline**. Platform:** Univer system

№	Point / Criterion	DESCRIPTORS				
		Excellent	**Good**	**Satisfactorily**	**Unsatisfactory**	
		90–100 points	**70–89 points**	**50–69 points**	**25–49 points**	**90–100 points**
2.						

Formula for calculating the final grade:

Final grade (FG) = (P1+P2+P3) / 3C, where P – points according to the criterion, C – total number of criterion