**Program of final attestation on discipline**

**PMP 7304 «Polyfunctional microbiological preparations»**

**Educational program «8D05111 – Microbiology»**

**Form and platform final control:** Writing exam

1. Explain the main functions of Polifunctional Microbiological Preparations (PMPs) in agriculture and discuss their significance in sustainable farming practices.
2. How do Polifunctional Microbiological Preparations (PMPs), including biofertilizers, nitrogen-fixing bacteria, and phosphate-mobilizing microorganisms, contribute to soil fertility improvement in agriculture?
3. Explain the role of biopesticides and biocontrol agents in managing plant pathogens within agricultural systems
4. Discuss the role of microbiological preparations in the food industry. What are the primary applications of these preparations in food production, preservation, and safety, and how do they contribute to product quality and consumer health? Provide examples of specific microbial strains and their functions within these applications.
5. Explain the roles of probiotics and prebiotics in the production of functional foods. How do they differ in terms of their effects on gut health, and what are their specific benefits when included in functional food products? Provide examples of functional foods containing probiotics and prebiotics, and discuss their impact on consumer health and wellness.
6. **How are microorganisms used in the production of fermented food products?** Describe the role they play in the fermentation process and provide examples of common fermented foods produced through microbial activity.
7. What is environmental biotechnology, and how do microbial preparations contribute to environmental protection and sustainability? Discuss specific applications of microbial preparations in areas such as waste management, bioremediation, and pollution control, and provide examples of successful outcomes in these fields.
8. How are microbial preparations utilized for the bioremediation of contaminated areas? Discuss the mechanisms by which these preparations help to detoxify pollutants and restore environmental health. Provide examples of specific microbial preparations and their effectiveness in addressing various types of contamination.
9. What is the process of bio-purification of wastewater using microorganisms, and how does it contribute to wastewater treatment? Explain the roles of different types of microorganisms in breaking down pollutants, and provide examples of successful bio-purification systems or techniques used in treating wastewater.

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

**Discipline**: Polyfunctional microbiological preparations. **Form:** standard writing/online**. Platform:** Univer system

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| **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**: Polyfunctional microbiological preparations. **Form:** standard writing/online**. Platform:** Univer system

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| --- | --- | --- | --- | --- | --- | --- |
| **№** | **Point** | **DESCRIPTORS** | | | | |
| **Criterion** | | **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