



«APPROVED»

**Member of the Board – Vice
Rector for Academic Affairs
NJC «Al-Farabi KazNU»**

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04 2025

TPN94C

**Entrance Examination Program For Master's
Degree Educational Programs Faculty of Biology and Biotechnology
For International Fee-Paying Applicants**

1. General Provisions

1.1. This program is developed in accordance with the Order of the Minister of Education and Science of the Republic of Kazakhstan No. 600 dated October 31, 2018, "On the Approval of the Standard Rules for Admission to Educational Institutions Implementing Educational Programs of Higher and Postgraduate Education" (hereinafter referred to as the Standard Rules).

1.2. Al-Farabi Kazakh National University admits individuals who have completed higher education programs to master's degree educational programs.

1.3. Entrance examinations are conducted in the form of an interview for the following educational programs:

- 7M05101 – Biology
- 7M05109 – Biotechnology
- 7M05116 – Microbiology
- 7M05117 – Ecological Bioengineering
- 7M05121 – Agro-Biotechnology
- 7M05105 – Genetics
- 7M05112 – Geobotany
- 7M08402 – Aquaculture and Aquatic Biological Resources
- 7M05102 – Biomedicine
- 7M05113 – Neuroscience
- 7M08401 – Fisheries and Industrial Fishing
- 7M05118 – Zoology

1.4. The entrance examinations for international applicants are organized by a subject examination commission, established annually by the Rector of Al-Farabi Kazakh National University. The commission consists of members from the Department of Internationalization and Recruitment (hereinafter referred to as DIR) and faculty members of the university.

1.5. If an international applicant who meets the above requirements is unable to travel to the university for the entrance interview, they have the option to take it online.

1.6. The entrance examinations, conducted in the form of an oral interview, are evaluated on a 100-point scale. The minimum passing score for admission on a fee-paying basis is 75 points for the scientific-pedagogical track (2 years) and 50 points for the professional track (1–1.5 years).

1.7. Based on the results of the entrance examination, an interview protocol is prepared in the prescribed format. The protocol is signed via the "Salem Office" system by the chairperson and all commission members present and is then submitted to the DIR.

1.8. The decision on admission is reviewed by the Admissions Committee for International

Applicants are formalized by protocol via the "Salem Office" system. Examination results are announced on the day of the exam.

1.9. Retaking the entrance examination is not permitted.

1.10. An appeal regarding the interview results can be submitted within 24 hours.

2. Entrance Examination for 2025

2.1. The interview is conducted in Kazakh, Russian, and English. The oral interview includes questions that assess the applicant's learning ability, creative thinking, critical thinking, and personal qualities.

2.2. Sample Interview Topics:

1. Vascular system and its components.
2. Circulatory system: arteries and veins. Distribution patterns in the body.
3. Nervous system: Brain structures and functions (medulla oblongata, hindbrain, midbrain, diencephalon).
4. DNA replication: Principles, experimental proof (Meselson-Stahl experiment), replication of circular DNA.
5. Proteins: Structure, functions, properties, amino acids, classification, spatial structure, isoelectric points.
6. Nucleic acids: Structure of DNA and RNA, Chargaff's rules, types of RNA, protein biosynthesis, ATP and ADP systems.
7. Basic principles and methods of genetic engineering.
8. Genetically modified organisms (GMOs).
9. Plant and animal breeding.
10. Water exchange and photosynthesis (light phase, electron transport).
11. Plant respiration: Oxidation pathways, glycolysis, Krebs cycle.
12. Nutrient media and their preparation methods.
13. Primary and secondary metabolites of industrial significance.
14. Selection and improvement of organisms for biotechnological applications.
15. Industrial methods for obtaining microbial proteins and enzymes.
16. Vegetative organs of plants: root, leaf, stem, shoot.
17. Current issues in geobotany.
18. Ways to preserve biodiversity and the significance of Red List species.
19. Conservation measures for endangered species.
20. Levels of organization of living organisms.

2.3. Recommended Literature for Preparation:

1. Dayneko N.M., Zhadko S.V. *Botany: Systematics of Higher Plants*. – Chernihiv: Desna Polygraph, 2016. – 40 p.
2. Lotova L.I. *Botany: Morphology and Anatomy of Higher Plants*. – Moscow: Librokom, 2010. – 512 p.
3. Nurtazin S.T. *General Histology*. – Almaty: Kazakh University, 2010. – 240 p.
4. Sinelnikov R.D., Sinelnikov A.Y., Sinelnikov Y.R. *Atlas of Anatomy*. – Vol.1 – 488 p., Vol.2 – 536 p., Vol.3 – 316 p.
5. Zhimulev S.G. *General and Molecular Genetics*. – Novosibirsk: Siberian University Publishing, 2007. – 480 p.
6. Bochkov N.P. *Clinical Genetics*. – Moscow: GEOTAR-Media, 2018. – 592 p.

7. Vasilenko V.N., Maksimov G.V., Stepanov V.I. *Genetics Problem Collection*. – Moscow: Vuzovskaya Kniga, 2020. – 144 p.
8. Mushkambarov N.N., Kuznetsov S.L. *Molecular Biology*. – Moscow: MIA, 2007. – 535 p.
9. Konichev A.S., Sevastyanova G.A. *Molecular Biology (4th ed.)*. – Moscow: Academy Publishing, 2012. – 400 p.
10. Watson J., Baker T.A., Bell S.P., Gann A., Levine M., Losick R. *Molecular Biology of the Gene (7th ed.)*. – Cold Spring Harbor Laboratory Press, 2004-2013.
11. Reese E., Sternberg M. *Introduction to Molecular Biology: From Cells to Atoms*. – Moscow: Mir, 2002.
12. Saparov K.A. *Cytology and Histology: Textbook*. – Almaty: Kazakh University, 2019. – 311 p.
13. Turasheva S.K. *Application of Plant Biotechnology: Monograph*. – Almaty: Qazaq University, 2020. – 114 p.
14. *Foundations in Microbiology* (11th ed.). – 2021. Edited by Talaro K.P.
15. *Hugo and Russell's Pharmaceutical Microbiology* (9th ed.). – 2023. Edited by Brendan F.

3. The scale and criteria for assessing the entrance exam for admission to a Master's degree (specialized field) for foreign citizens on a fee-paying basis:

Number of points	Compliance criteria
90-100 points "Excellent"	All competencies required for the entrance exam have been mastered. A full, detailed answer has been given to 2 theoretical questions: - scientific terminology has been used correctly; - all the features, elements, bases, and classifications necessary for substantiation have been correctly named and defined; - the main points of view accepted in the scientific literature on the issue under consideration have been indicated; - your own position or point of view has been substantiated, and the most significant research problems in this area have been identified. The practical task has been solved correctly with all the necessary explanations.
75–89 points "Good"	All competencies required for the entrance exam have been mastered. The correct answer to 2 theoretical questions has been given, minor deficiencies have been identified in the preparation: - scientific terminology is used; - all the features, elements, classifications necessary for justification have been named, but an error or inaccuracy in definitions and concepts has been made; - there are deficiencies in the argumentation, factual or terminological inaccuracies have been made that are not significant; - an idea has been expressed about possible research problems in this area. The practical problem is solved partially with incomplete

	presentation of the necessary explanations.
50–74 points “Satisfactory”	All competencies required for the entrance exam have been mastered. The correct answer to 2 theoretical questions has been given, minor shortcomings have been identified in the preparation: - only some of the bases, features, and characteristics of the phenomenon under consideration have been named and defined, - significant terminological inaccuracies have been made; - no personal point of view has been presented; - no idea of possible research problems in this area has been expressed. The practical task has not been solved.
0–49 points “Unsatisfactory”	Not all competencies required for the entrance exam have been mastered. Incorrect answers were given to 2 theoretical questions, significant shortcomings were identified in the preparation; The practical task has not been solved.