

MINISTRY OF SCIENCE AND HIGHER EDUCATION OF
THE RUSSIAN FEDERATION
NATIONAL RESEARCH
TOMSK STATE UNIVERSITY
Advanced Engineering School "Agribiotech"



APPROVED BY

Vice Rector for Academic Affairs

E.V. Lukov

E.V. Lukov 2023 year

PROGRAM

Entrance examinations to the magistracy in the direction of training

06.04.01. Biology

Basic Professional Educational Program

“Bioinformatics”

Form of training

Full-time

Tomsk-2023

Authors-compilers:

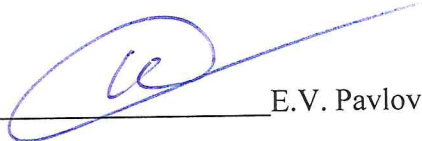
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Abbreviations used

BPEP - Basic Professional Educational Program.

NI TSU - National Research Tomsk State University.

RF - Russian Federation.

1. General Provisions

1.1. The program of entrance examinations in the direction of preparation 06.04.01. Biology BPEP "Bioinformatics" includes an interview on the profile of the program, which allows you to evaluate readiness and motivation of applicants to master the master's program.

1.2. The program of entrance examinations contains a description of the procedure, the program of entrance examinations and criteria for evaluating answers.

1.3. Entrance tests are conducted in English.

1.4. The organization and conduct of entrance examinations is carried out in accordance with the Admission Rules approved by the order of the rector of NR TSU, valid for the current year of admission.

1.5. According to the results of entrance examinations, the applicant has the right to appeal in the manner prescribed by the Admission Rules in force for the current year of admission.

1.6. The program of entrance examinations is annually reviewed and updated taking into account changes in the regulatory framework of the RF in the field of higher education and local documents regulating the admission procedure to NR TSU. The modified program of entrance examinations is considered and recommended for use at the meeting of the Advanced Engineering School "Agrobiotek" of TSU. Approved by the vice-rector for educational activities.

1.7. The program of entrance examinations is published on the official website of the National Research Tomsk State University in the "Master's" section no later than the date specified in the Admission Rules, valid for the current year of admission.

1.8. — The program of entrance examinations in the direction of preparation 06.04.01. The biology of the BPEP "Bioinformatics" is stored in the documents of the Advanced Engineering School "Agrobiotek" of TSU.

2. Purpose and objectives of entrance examinations

2.1. Entrance tests are designed to determine the preparedness of the applicant for the development of the OBEP master's program "Bioinformatics" and are carried out in order to determine the required competencies of the applicant, necessary for the development of the program in the direction of training 06.04.01. Biology.

2.2. The main tasks of entrance examinations:

– determination of the level of knowledge in the field of scientific and professional interests of the future undergraduate;

– determination of the readiness of the applicant for the development of the OBOR master's degree in direction of preparation 06.04.01. Biology;

– identifying the motivational readiness of applicants for training in the magistracy;

— determination of readiness to conduct research activities.

3. Entrance test in the direction of training 06.04.01. Biology: structure, procedure, content and criteria for evaluating responses

3.1 The procedure for conducting an entrance examination

The entrance test determines the level of knowledge in the field of scientific and professional interests of the future undergraduate, the motives for entering the magistracy, his readiness to conduct research activities, professional experience; clarifies the proposed research topic. The entrance test is conducted in a remote format (using electronic technologies) in the form

of an interview on the profile of the program using video communication tools Zoom <https://us04web.zoom.us/j/2636315407?pwd=WXZLcXUxK295bXdzNm5VYURKNG1iUT09>.

When passing the interview, the applicant answers 2 questions from Block 1a "Biology", 2 questions from Block 1b "Computer sciences", and 1 question from Block 2 "My motivation".

The applicant's answer is heard by the examination committee.

During the interview, members of the commission may ask additional questions from of the presented list of questions, as well as clarifying questions when answering the applicant to their chosen questions.

The examination committee fixes the applicant's answer and additional questions in the minutes of the meeting of the examination committee.

The total duration of the interview is no more than 30 minutes, taking into account individual characteristics of the applicant.

The maximum number of points for an interview is 100. The minimum number of points for a successful interview is 60. An applicant who scores less than 60 points for an interview cannot be enrolled in a master's program.

An applicant enters without entrance examinations if he is:

- medalist, winner or prize-winner of the Olympiad "I am a professional" in any of the directions;

- the winner and prize-winner of student competitions held under the auspices of the Association of Educational Institutions of Higher Education "Global Universities" for students in bachelor's and specialist's programs. relevant areas of training;

- the winner or prize-winner of the International Olympiad for students "Open Doors";

- the winner of the Olympiad "Master of TSU" in the direction of "Management in technical systems".

3.2 Interview questions

Block 1a "Biology"

Central dogma of life.

Block 1b "Computer Science"

Types of programming used in Bioinformatics (R and Python).

Block 2 "My motivation"

My research project during my undergraduate studies

During the entrance examinations, the applicant must demonstrate:

- communication skills, using professional terminology in English language;

- the ability to perceive information, logically correctly argue and competently build oral speech using professional terminology in English, critically assess their strengths and weaknesses.

Express your thoughts clearly;

- knowledge of the main classes and subsystems of information systems, their methodology development.

3.3 Evaluation of the entrance test in the form of an interview.

The assessment of the entrance examination is carried out by the examination committee, acting on the basis of the Regulations on the examination committee and the Admission Rules, in force for the current year of admission.

The overall score is defined as the average score given by all members examination commission based on the results of the assessment of the entrance test.

Evaluation criteria

Range assigned points	Evaluation criteria
91-100	Applicant showed comprehensive, deep and systematic knowledge educational material; the answer differed in the accuracy of the used concepts; The material was presented in a coherent and logical manner. Was demonstrated the ability to formulate, argue and defend your point of view. Additional questions were received complete and consistent responses. Demonstrated a high degree of motivation for learning program profile.
81-90	The applicant showed a comprehensive, deep and systematic knowledge of the educational material; the answer differed in the accuracy of the used concepts; The material was presented in a coherent and logical manner. Was demonstrated the ability to formulate, argue and defend your point of view. However, not all additional questions were given full and consistent answers. Demonstrated a high degree of motivation for learning program profile.
71-80	The applicant showed a good knowledge of the material on the examination questions. Have the skills of argumentation and upholding one's own points of view. However, the material was presented inconsistently, gaps in knowledge are obvious. When answering additional questions some inaccuracies were made. The applicant is fully motivated to study according to the profile programs.
60-70	Applicant showed a level of knowledge sufficient to start training in the main educational program: owns basic concepts. However, for basic and additional questions were answered without the necessary disclosure completeness and consistency, individual inaccuracies. The applicant demonstrates a desire to study in the profile programs.
1-59	The applicant's response revealed significant gaps in knowledge of the educational material, when answering, rude errors. The applicant answered uncertainly to additional questions. and with significant errors. The level of knowledge does not allow start mastering the main educational program. The applicant is not sufficiently motivated to study in the profile programs.
0	The applicant refused to answer questions.

Verification and evaluation of the results of the entrance examination is carried out examination committee acting on the basis of the Regulations on the examination commission and Admission Rules in force for the current year of admission.

The number of points for the interview is brought to the applicant for the next day after passing the certification test.

4. List of literature for self-training

1. Robert Gentleman. R Programming for Bioinformatics. 2008. Chapman and Hall/CRC. ISBN: 9781420063684.
2. Brown T. A. Genomes 2nd edition. 2002. Oxford: Wiley-Liss. ISBN-10:0-471-25046-5
3. David P. Clark, Nanette J. Pazdernik and Michelle R. McGehee. Molecular Biology. 3rd edition. Academic Cell. ISBN. 978-0-12-813288-3.
4. Bromham, L. An Introduction to Molecular Evolution and Phylogenetics. 2nd edition. 2016. ISBN-13: 978-0198736363. Oxford Univ Press.
5. Advanced AI Techniques and Applications in Bioinformatics (Smart and Intelligent Computing in Engineering). 1st Edition. 2021. CRC Press. ISBN-13: 978-0367641696
6. Thomas, D., Hunt, A. The Pragmatic Programmer: Your Journey To Mastery, 20th Anniversary Edition. 2nd edition. Addison-Wesley Professional. ISBN-13: 978-0135957059