

Topics and main instructions for the entrance examination

MPA-BIO (double degree)

The entrance examination consists of two parts which take place in one day. The first part is written or online test. The second part is an interview (physical or online).

Instructions and topics for the test

This written or online knowledge test contains 21 multiple choice questions (2 points each) and 2 open questions (9 points each). In a case of multiple choice questions, you can select one or more correct answers. If you choose the wrong answer, the total score for that question will be zero. If your choice is a combination of correct and incorrect answers, the specific question will be scored zero. In a case of open questions, you will be asked to explain or describe some specific term or phenomena. The test is limited to 35 minutes, and the maximum overall score available is 60 points.

The following topics will be covered by the test (three questions from each topic):

1. Basics of statistics – probability distribution, testing hypotheses, one-sample tests, parametric and nonparametric methods, ANOVA, linear regression.
2. Digital signal processing and analysis – sampling, digital filters description, properties and design, frequency analysis, correlation analysis.
3. Basics of human anatomy and physiology.
4. Principles of medical diagnostic instrumentation – amplifiers for biosignals, analog filters, principle of basic devices for ECG, EMG, EEG acquisition, blood pressure and blood flow measurement, instrumentation for respiratory, monitoring of the vital functions.
5. Principles of therapeutic instrumentations - electrical stimulation of muscles, pacemakers, ultrasound physical therapy, high-frequency heating of tissues, cryosurgery, radiotherapy.
6. Measurement of basic electrical quantities - measurement of current, voltage, power, frequency, phase shift, impedance, capacity, inductance; basic modules of electronic instruments (power supplies, filters, amplifiers, comparators, electronic switches, flip-flops), logic circuits and principles of realisation of logical functions.
7. Overview of medical imaging systems - X-ray imaging systems, computed tomography (CT), magnetic resonance imaging (MRI), single photon emission computed tomography (SPECT), positron emission tomography (PET), ultrasound imaging, infrared imaging.

Interview

This part of the entrance exam takes approximately 15 minutes. The committee will ask you about your motivation to study and your plans. In addition, questions from the technical topics mentioned above will be given as well. The maximum score for this interview is 40 points.