Regulations
on the VII International Olympiad in Fundamentals of Technical Systems Control Automation

These regulations have been developed in order to achieve the objectives of improving the quality of vocational education, developing students' creative potential and key professional competences.

These regulations define the Olympiad main aims and objectives, organizing procedure, participation procedure, and the winner determination.

The Olympiad aims and objectives

- developing students' creative potential;
- developing students' interest in learning about modern automation systems, artificial intelligence, logical controllers programming;
- contributing to students' ability to find solutions to non-standard problems, as well as their deeper and more solid grasp of modern knowledge;
- identifying talented students; - enhancing teachers' creativity;
- promoting the development of teachers' academic mobility.

The Olympiad organizer's responsibilities

- by 27 February 2024, the Olympiad organizer develops, approves and publishes on the USPTU official website http://olimpiadaatm.ru the conditions and requirements for the Olympiad;
- the Olympiad organizer forms the Organizing Committee, the Methodical Committee and the Olympiad jury, approves their composition and authority;
- the Olympiad organizer ensures the development and storage of the tasks and the running of the Olympiad;
- the Olympiad organizer approves the results of the Olympiad and communicate them to the participants;
- the Olympiad organizer carries out the winner awarding;

- by 3 April 2024, the Olympiad organizer publishes the report on the Olympiad and the list of winners on the USPTU official website http://olimpiadaatm.ru.

The Olympiad procedure

Bachelor's, Specialist's and Master's students participate in the Olympiad according to the results of the selection round within educational institutions or according to the results of personalized selection by teachers on the subject of the Olympiad.

The Olympiad is held in Ufa State Petroleum Technological University (1 Kosmonavtov str., Ufa, Republic of Bashkortostan, Russia), at the Department of Automation, Telecommunication and Metrology of the Institute of Institute of Digital Systems, Automation and Energy.

The participation in the Olympiad is free of charge, no registration fee is charged. The participants are responsible for travel costs and accommodation in Ufa during the Olympiad.

The identity of the students participating in the Olympiad is verified by a student ID card or passport during registration.

The first part of Olympiad is **Theoretical**. It is going to be **27 of March 2024** and consists of two stages.

Stage I is a personal championship test in the following sections:

- Fundamentals of technological process automation;
- Engineering system management;
- Metrological support for measurements;
- Artificial intelligence in manufacturing automation;
- Measuring and telecommunication systems;
- Logic controllers programming;
- Smart-city technology.

Themes: automation equipment (field level), engineering measuring and tools, electronic and electrical engineering, functional diagram of automation,

metrology, automatic control theory, logic control systems' algorithm design, programmable logic controllers.

Stage II includes solving a task of complex designing of automation system. It includes design of block diagrams, algorithms of managing logic systems, selection and justification for automation equipment. Stage II provides for the participation of teams. The recommended number of participants in a team is 4-5 people. In-person or remote (online) participation in the Olympiad is possible. But USPTU students have to participate if personally present.

The practical round "Microcontrollers C++ programming" continues the Olympiad. It is going to be offline on **29 of March 2024** at Kosmonavtov str., 1, Ufa. The recommended number of participants in a team is 3-4 people.

The Olympiad is held in a specially prepared and equipped room with internet access.

The participants are informed of returned checks of Stage II.

The jury consists of a coordinator from the teams of the universities participating in the competition.

Links for connecting to the opening event of the Olympiad, for the Stage I test (personal test), and for connecting to the team stage are provided to the university coordinators.

Conditions for the Olympiad

1. **Stage I** is a computer-based testing for each section, arranged remotely.

It is possible to gather the participants in a university classroom with internet access, equipped with video surveillance and the possibility to connect to the general broadcasting. A tutor has to stay in that room during the whole period of the test and video surveillance is required. It is also possible to connect individual participants to a specific e-room by prior agreement with the Organizing Committee.

The maximum time for completing the tasks of each section is 60 minutes. The participants receive individual tasks in the form of 40 test questions and tasks by lot. The weight of each question and task is determined in advance and indicated on the ticket.

A student is allowed to participate in all the sections of the Olympiad as part of the individual competition.

2. **Stage II** includes solving a complex team task, using the handout provided by the Organizing Committee. Solving period will be 180 minutes.

The complex task deals with the development of a control algorithm and a tool to implement it.

Stage II may be arranged in-person or remotely (online).

The stage has to be video monitored for general broadcasting and a supervisor has to stay in the classroom during the whole period of the task solution.

3. **The practical round** is a command task. It provides C++ programming of microcontroller. The maximum time for this task is 180 minutes. This round is carried out in the online mode.

The competition expects to following stages: developing and assembling of principle scheme of automation object units according to practical round declared conditions; program developing and testing for automation object operation; run automation object and script runtime system.

4. The participants are not allowed to use any mobile devices, the Internet or removable media during the Olympiad.

Summing up the results, awarding the participants of the Olympiad

The winners of the Olympiad in individual and team competitions will be awarded 1,2,3 places, Diplomas and prizes. The winners of the Stage I of the Olympiad make up not more than 25% of the participants in each section.

Letters of appreciation will be sent to the educational institutions for the teachers who provided the participants of the Olympiad.