WORLDSKILLS FUTURESKILLS KAZAN 2019

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world skills Russia

skills future

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1 WHAT IS FUTURE SKILLS

Since 2015 WorldSkills Russia has been conducting international research, actively engaging experts and representatives of the WorldSkills community through foresight and project sessions to research the question of how the professional world driven by rapid global changes in the field of technology and production will transform in the 21st century.

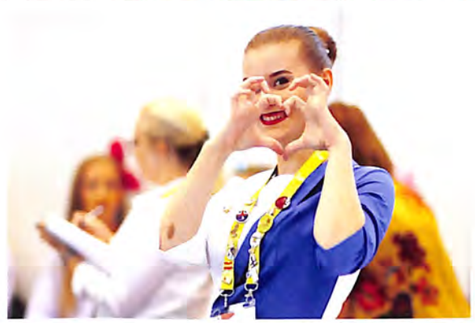
FUTURE SKILLS PROJECT INCLUDES

- Research and forecast of future demand for skills, and transformation that will be required in education & training systems to match this demand
- Future Skills labs at WorldSkills Competitions
- Description of technologies demanded and Description of existing skills gap.
- Description of Future Skills and Future Jobs Profiles
- Development of education programmes and curriculum for future skills and future jobs. Advanced training as part of universities, colleges and in – company training centers educational programmes

2 FUTURE SKILLS ZONE IN KAZAN 2019

At WorldSkills Kazan 2019, on a 10,000-square-meter site WorldSkills Russia and partners will create a presentation zone for emerging jobs and skills – FutureSkills.

The Future Skills zone will be a "smart city" model. This zone will provide industry leaders, governments, and educational institutions, as well as participants and guests, an opportunity to see professional skills and work functions of the future.



The FutureSkills area will be designed as a "smart city" model with the following key areas of activity:

- Manufacturing and Engineering Technology;
- IT and Digital Technology;
- Construction and Building Technology;
- Energy;
- Agriculture;
- Transport;
- Education;
- Creative Arts and Design.

For each of these areas, WorldSkills Russia together with WSI members and International partners will demonstrate the most advanced skills, which satisfy the following criteria:

- The proposed skill reflects the growing trend and, as a consequence, requires training;
- The proposed skill is applicable to several areas of activity;
- The proposed skill reflects expertise, abilities, and knowledge that are especially needed in the new, complex, and rapidly changing world (with a focus on "soft" skills).

Future Skills will be represented by Competition Skills and Showcase Skills. Future Skills Competition is regulated by Competition Rules of WorldSkills and will have a separate Award ceremony.

3 FUTURE SKILLS OVERVIEW

Industrial Design Technology

Industrial design defines functional and external qualities of products and includes elements of art, marketing and technology. The development of industrial design includes the following stages: generating an idea, conceptual elaboration, sketching, layout, 3D modeling, visualization, designing, prototyping. To create a sketch of the product, industrial design provides not only artistic and analytical activities, but also the knowledge of a number of graphic programs: 3D Studio Max, SolidWorks, solidThinking, Rhinoceros, Pro / Engineer, 3D CAiD, Solid Edge, as well as programs for industrial design automation and CAD programs that provide implementation of concepts and sketches of the produced goods.

Industrial Robotics

Industrial robotics is one of the new and promising directions of automation of production processes. Specialists in the field of industrial robotics are engaged in the design, setup, programming and implementation of robotic systems in an industrial automation environment.

Competitors are provided with modern industrial robots with advanced technological equipment. The task is in the shortest possible time to collect, carry out commissioning, connect and configure the security system, and program the robotic cell according to the assigned test project.

Composite technology

A set of engineering, production, technological and organizational techniques, tools and skills involved in the design, technological preparation, manufacture and testing of composite products.Test project is a unified technical task, the result of which is a product made of modern composite materials, as well as a set of design documentation. Competitors plan their work independently, proceeding from optimization of time and economic costs and maximum full compliance of the result with the requirements of the competitive task.

UAV Operating

The skill includes management and operation, detection and elimination of malfunctions in the unmanned aerial vehicle of the copter type, the use of technical means and equipment, remote piloting and the performance of operational missions. A specialist might have various specialization: technician, operator (external pilot), programmer. Test project is designed to test the skills of diagnostics and repair of the device, work with procedural documents, piloting, carrying the goods with copter, applying software based on the results of orthophotography.

Reverse Engineering

Reversing engineering is a new direction in the development of additive technologies. The main applied value is the possibility of obtaining the exact sizes and shapes of the most diverse objects for quick repair, replacement of a failed part. Reversing engineering is especially relevant for the repair or modernization of obsolete equipment in the absence of technical documentation. The trade is only emerging, but it is a promising direction due to the possibility of application in many industries.

Competitors are given the details used in the engineering industry and in medical equipment that have mechanical damages. The task is to get the digital model of the part in the shortest possible time using an optical device for contactless digitization, process digitized data in specialized software, obtain a solid model of the usable part and produce a plastic prototype using a layer-by-layer synthesis unit.

Quantum Technology

This skill involves the use of the fundamental laws of quantum physics to solve problems related to secretly transferring information, increasing data-transfer speed and processing power, and efficiently processing large amounts of information. Protected quantum communications, ultra-sensitive quantum sensors, and quantum computers make it possible to manipulate complex quantum systems at the level of individual objects and provide for production-grade quantum key distribution.

Blockchain Technology

This skill involves the use of blockchain technology as a repository of reliable information about the education of the user of the system. Blockchain is most widely used in connection with cryptocurrencies.

Competitors must demonstrate their skills in the areas of programming, testing, locating, and performing maintenance on solutions using blockchain technology. Participants will demonstrate their ability to detect and eliminate vulnerabilities and defects in the software solution provided to them: the aim is the development of a software solution using blockchain technology to record, store, and access information. Participants will have to create a "digital footprint."

Virtual and Augmented Reality

Today virtual and augmented reality applications are regularly used in many areas as convenient control interfaces, simulators, innovative learning programs, in the entertainment industry, and in business.
Participants must develop two applications in three days:
1. A virtual-reality app
2. An augmented-reality app

Details of the test project are kept secret and are disclosed only to the participants on the day the competition begins. Teams of three must develop their apps, from design document to fully operable product, for the target devices: VR helmets and mobile platforms.

Machine Learning and Big Data

Machine learning is the implementation of data analysis without the use of clearly determined algorithms. In the past decade, machine learning has been implemented in driverless cars, speech recognition, effective search systems, etc. Machine learning has become ingrained in our everyday lives.

The aim of the Machine Learning and Big Data skill is to develop the ability to process data properly, exchange data efficiently, and perform basic reconnaissance on large, complex data sets. In this skill, the most effective algorithms for machine learning and big-data processing are applied, and participants gain experience implementing them in practice.

Mobile Application Development

This skill is aimed at developing a mobile application that combines uninterrupted operation on a mobile platform (Apple iOS, Google Android, Windows Phone), a user-friendly interface, and multifunctionality. Competitors develop an app to optimize organizational tasks related to holding events. In addition to storing data, the app should allow you to assign tasks and monitor their fulfillment. Each participant's application will be able to interact with the applications of other participants, making the contest interactive.

Protection Against Internal Threats to Corporate Information Security

This skill involves the implementation of professional measures and actions related to protecting an enterprise from internal threats to information security. Test projects will be based on real-life incidents and leaks of confidential information that took place at Russian and foreign companies.

3D Prototyping

Prototyping engineer must possess a number of skills, such as knowledge of 3DCAD systems and CAM systems, including milling, printing and other kinds of CAM machining, vacuum casting, prototyping using hand tools and machinery, as well as spray painting and finishing.

Competitors should be able to develop and manufacture a functional prototype of a self-balancing scooter composed of 18 parts including the prefab components made available. This should be done within 22 hours.

Internet of Things

The "Internet of Things" skill aims at training and testing the knowledge of specialists able to develop Internet of Things related solutions. Specialists of this skill are now of great demand in the labor market. As a level of the required skills and competences of a competitor in the Internet of Things skill, we use the requirements for employees who pretend to be specialists in the Internet of Things development solutions (Solution Architect / Solution Developer)

4 FUTURE SKILLS SHOWCASING OVERVIEW

Agricultural Biotechnology

Agricultural biotechnologists receive, research and use enzymes, viruses, microorganisms, plant cell cultures, their biosynthesis and biotransformation products, production technologies of microbiological synthesis, biocatalysis, genetic engineering and nanotechnologies; they provide operation and quality management of biotechnological manufacturing, in compliance with national and international regulations, the management and quality control of raw materials, intermediate products, and finished product.

The competition includes the preparation of mother-liquors of nutrient media, the nutrient media themselves, the preparation and introduction of plant tissues into in vitro culture, the induction of callus formation and morphogenesis from sterile plant tissues, the analysis of species and varietal features of plants in vitro, the determination of the multiplication factor, rhizogenesis effectiveness and adaptation of microplants.

Building Information Modelling Technology

Using BIM technology specialists of different sections of the project fill all the necessary information about the object in the 3D model of the building. This ensures close interaction of specialists and an integrated approach to the design process. Barriers between architects, planners, accountants, accountants and managers disappear, each project participant always has access to information for decision-making. The technology of information modeling helps to re-evaluate the project before construction begins, reduces the number of errors and improves the quality of design.

Digital Factory

The purpose of the test project is to design, launch, manage and analyse the production line, including big data analysis and SCADA system. Since there are a large number of companies, which provide their technologies for the development of such systems, the competitors must know these systems and be able to create a solution or application on their basis.

Digital Farming

The task project is based on the creation of an integrated agricultural production system and its control. This system must be based on the use of automatic control and regulation of technology and aim at optimizing agricultural technologies and stabilizing the productivity of agricultural crops to minimize negative impact on the environment.

Neural Interfaces Design

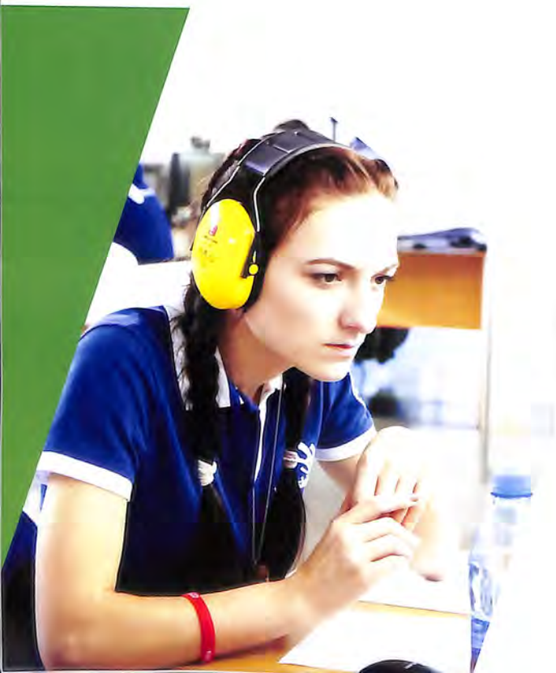
The purpose of the task project is to design an autonomous interface for the management of a physical object. The skill includes identifying the criteria for the electrical activity of brain used as the resultant signal for controlling the physical object, constructing the assembly of the neuro interface on dry electrodes, assembling the hardware of the brain's computer interface according to the circuit diagram, programming this device and pairing it with the physical object of management.

Digital Fashion Designer

The skill involves designing, demonstrating and testing the properties of clothing in a virtual environment. Competitors should know how to work in a special 3D program to complete the task project successfully.

Digital Welding

This skill includes elements of mechanics, electronics and computer technology. To carry out the task project, specialists in this field should have the knowledge of pneumatic automation, mechanics, programming, and know how to deal with systems with electrical control, and to develop automated systems.



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