

## LEARNING AND STUDENTS

### Programs for environmental protection

INRTU is working to implement more topical educational programs in the field of freshwater ecosystems. Currently it offers following both bachelor and master programs on Water Management; Environmental Protection and Resources Conservation; Construction - Innovative Technologies in Water Supply and Sanitation. Besides, there is a variety of programs including courses on freshwater ecosystems such as Technosphere Life Safety; Technological Processes and Industries Safety; Ecology and Green Engineering; Renewable Energy; Public Safety and Ecology Risk Management; Production and Consumption Waste Disposal and Recycling; Ecological Safety.

### Mendeleev Environmental expedition

In addition, INRTU carries out a range of outreach activities with local schools and the community. Among them, Mendeleev Environmental Expedition, which was held in September, 2021. Both high school and university students participated in the expedition working on joint projects. In particular, the joint project of INRTU and school students was dedicated to water bodies in the region that require increased attention.



## RESEARCH



### Conference for Climate change research

Every year, since 2018, INRTU has been held a *Conference on Snow Cover, Precipitation, Aerosols: Chemistry and Climate*. The conference focuses on methods, tools, methodology of research of physical and chemical properties and composition of snow cover, atmospheric precipitation, aerosols, as well as the impact of their chemical composition on climate change, physical and chemical processes in the atmosphere and anthropogenic activities. The main topics are: observation, interpretation and mode.



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publications on environmental protection, including protected natural areas

## PUBLIC ENGAGEMENT

### Projects for sustainable water consumption

Ilya Subarman, an INRTU freshman student, is developing a system of sustainable water consumption. The project is called *ECOrakovina* (ECOsink). He started the project a year and a half ago. The idea was supported by specialists from the *Legacy 21 Startup Business School*. Now the curators are helping the polytechnic student to develop technical solutions. The young researcher proposes to reduce the amount of water consumed in residential buildings. It is possible by using of the following scheme: water is used in the sink, cleaned with a filter, accumulated and sent to the drain tank with the help of a pump. According to the student's estimation, five liters of water can be used at one time.



### Environmental volunteering

INRTU employees and students united about 500 school students of the Angara region in the youth environmental movement. The project was started with ecological case-championships and educational lectures by the members of the Taiga student group. Eight educational institutions of Irkutsk and Irkutsk district became the sites of the project. The project received a grant support of 250,000 rubles from the Save Baikal! Ecological Foundation of the Irkutsk region. INRTU considers important to create a volunteer youth community in the Irkutsk region that is ready to broadcast green technologies and promote their development. It took more than half a year to develop the program, in which the student squads took part. Environmental cases and educational lectures on such relevant topics as Ecology, Food waste, Industrial wastewater treatment plants in the Angara region water bodies, Eco-trips in the Angara region, Environmental volunteer movement in the Irkutsk region and Russia were provided.



## OPERATIONS

### Water-saving in INRTU dormitories

INRTU launched a pilot project to install water-saving plumbing in dormitories. The first smart faucets and shower heads were installed during the overhaul of the Baikal School of BRICS dormitory. INRTU researchers approached the choice of water-saving sanitary ware responsibly, having studied in detail the principles of operation of various engineering solutions. Each of the 17 residential sections of the dormitory shower cabins are equipped with water sensors. A feature of the batch-push shower faucet is that the water cycle ends up automatically. To start the cycle, you need to press the water button once and release it. Repeat the cycle if necessary. This sequence of actions allows you not to touch the tap after turning it on and significantly saves water. Water supply is stopped after the set time regardless of the pressure in the system (consumption in 45 seconds - 3.2 liters at a pressure of 2 atm). In addition, there are two sensor faucets under the sinks in each section. The sensor faucets are powered by battery or mains. They help to use just the right amount of water. INRTU considers the experiment a success In the dormitory №11 A the consumption of cold water has been reduced by 30%, and hot water - by half. The smart plumbing fixtures are also planned to be installed in other INRTU dormitories.



### Project on Water Purification System from INRTU students

Sophomores at the N.I. Yaropolov Department of Chemical Technology Nikita Alimov and Chingiz Nimbuev won the regional contest of youth innovation projects. They presented their work on Improving Water Quality at the Sludge Dump with Membrane Water Purification Systems. Water filtration with the help of a membrane takes place in several stages. Contaminated liquid is passed through a special film (semi-permeable membrane), which has many tiny pores. They are so tiny that they are not visible to the naked eye. All impurities remain on the outside and only pure water passes through. Membrane filters are very popular nowadays. They are highly effective and allow purification of water at the molecular level. This method is suitable for many enterprises, including those involved in mining and mineral processing.