SAVONIA
UNIVERSITY OF APPLIED SCIENCES

Contact us! Let's roll up our sleeves and get to work.

ENVIRONMENTAL TECHNOLOGY

Education in the water sector and the RDI environment

Leverage from the EU 2007–2013

European Union
European Social Fund

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Does your enterprise or research institute need a research and testing environment in the water sector? Or do you need expert help in the product development or testing related to water treatment processes and water quality measurement? The water research environment of the teaching and research unit of environmental engineering at Savonia University of Applied Sciences is a unique entity, which is utilised by enterprises and research institutes of the water sector for the purposes of research and product development related to water treatment. Education in the water sector and the R&D environment are also suitable for educational institutions as a teaching and learning environment of the water sector, and for continuing education of waterworks personnel.

The water research environment of the teaching and research unit of environmental engineering at Savonia University of Applied Sciences comprises the pilot-scale surface water plant, the experimental water distribution network and an analytical laboratory. The pilot-scale surface water plant and the experimental water distribution network enable the study and development of methods related to water treatment and water safety.

Situated in the Kuopio Science Park, our high-quality research, educational and testing services are based on the competent personnel, versatile research equipment and close cooperation with the enterprises in the field and with other research institutes in the water sector. The versatile equipment and the competent cooperation network create an excellent basis for further development of water safety know-how and applications in Savonia's water research environment.

The services of the teaching and research unit of environmental engineering also include project and financial services related to the water sector. The teaching and research unit of environmental engineering is acknowledged as an organisation in charge of projects, with expertise in project funding options.

Waterworks research environment

The teaching and research unit of environmental engineering at Savonia University of Applied Sciences has a pilot-scale surface water plant, an experimental water distribution network and the analytical laboratory, which together constitute a unique waterworks research environment. In this environment, it is possible to study and develop methods related to water treatment and water safety. The research environment has been constructed in cooperation with the University of Eastern Finland and the Kuopio unit of the National Institute for Health and Welfare. It is utilised by enterprises of the water sector, waterworks, research institutes and educational institutions.

With the pilot-scale surface water plant and the experimental water distribution network, it is possible to carry out and monitor both short- and long-term measuring periods. Real-time equipment for measuring and analysing water quality, automated equipment and online surveillance enable precise and reliable testing periods and the simulation of various deviations in practical circumstances equivalent to reality. The measurement data obtained from the testing events are saved in the control room computer governing the waterworks and the water distribution network. Real-time process control is also possible via the internet.

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Pilot-scale surface water plant

The pilot-scale surface water plant is suitable for testing products related to water treatment and monitoring of water quality, for verifying functionality and for recognising development needs. Examples of these activities include chemical trials, testing of disinfection methods, as well as testing and development of water treatment unit processes and measuring and monitoring devices.

The pilot-scale equipment also enables training in the management of water treatment processes in circumstances that appear authentic but are safe. The plant receives the raw water from Lake Kallavesi, and its maximum treatment capacity is 3 m^3 per hour.

The unit processes of the pilot-scale surface water plant are:

» Rapid mixing
» Three-phase flocculation
» Flotation
» Rapid sand filtration
» Disinfection (chlorination/UV treatment)
» Final chemical application

Experimental water distribution network

The experimental water distribution network consists of several pipelines, with a total length of 600 m. The pipes are made of copper and polyethylene plastic. Water can be circulated in the network by utilising the entire network or only a part of it.

With the network, it is possible to study

» the impact of the drinking water treatment process on the water distribution network
» changes in water quality in the water distribution network
» the functionality of different pipe materials in the network

In the water distribution network, it is possible to create the desired circumstances e.g. by adjusting the flow velocity and by bringing about rapid pressure shocks in the pipe system. A closed network enables studies – such as contamination of water with microbes that are detrimental to health – that would not be feasible in a real-life water distribution network.

Control room

Control of the experimental water distribution network and the pilot-scale surface water plant takes place in the control room, which houses the computer where the measurement data from the trials of the network and the water plant is saved.

Technical data of the control room:

» Alarm limits can be determined for the measurement data. When a value is higher or lower than the alarm limit, the system sends an alarm SMS message to the mobile phone.
» Saving of measurement data in the control room computer.

Analytical laboratory

Laboratories which analyse clean water and wastewater operate in the premises of Savonia's teaching and research unit of environmental engineering. The versatile facilities and equipment of the laboratories enable comprehensive analyses of water samples e.g. on test series carried out in the pilot-scale surface water plant, wastewater and process water. Samples are analysed in a rapid and flexible manner, which enables the reliable analysis of even large test series. It is also possible to study the formation and composition of gas in biogas tests.

A scale model of a wastewater treatment plant is also available in the wastewater laboratory.

It enables the study of the wastewater treatment process and the testing of the functionality of various chemicals to the improvement of the process. In both laboratories, it is also possible to do precipitation tests with various chemicals, electrocoagulation and JAR flocculator.

Pilot-scale land filtration units for wastewater

The teaching and research unit of environmental engineering has three pilot-scale land filtration units, each with a surface area of one square metre. In the filtration units, it is possible to test and compare the functioning of different wastewater filtration materials and structures. The filtration units are situated in an insulated sea container that can be placed by the desired source of wastewater. The wastewater is first pumped to the settlement pond, from where it is then pumped with the desired flow rate to the filtration units.