

Education, Industrial machinery and heavy equipment

# Seinäjoki University of Applied Sciences

University partners with Siemens and IDEAL PLM to help add value for manufacturers while training the future workforce

## Product

Solid Edge, NX, Tecnomatix, SIMATIC

## Business challenges

Provide Finnish manufacturers with the next generation of digital talent

Help manufacturers define and apply new technologies

Demonstrate the promise of new technologies and encourage enterprises to rapidly adopt them

## Keys to success

Collaborate with Siemens in Finland and Siemens PLM Software partner IDEAL PLM to leverage the Industrial IoT

Use the SeAMK Digital Factory to foster an innovative, virtual learning environment

Demonstrate real-world implementation of Siemens' vision for digital enterprises

## Results

Enabled industry to add value while training the future workforce

Enabled Finnish companies to explore digitalization opportunities

Established a learning environment that attracted a great deal of interest from businesses

Actively adopted new technologies

**SeAMK uses a Digital Factory to enable Finnish firms to explore digitalization opportunities and create an innovative learning environment**

## Providing a global education

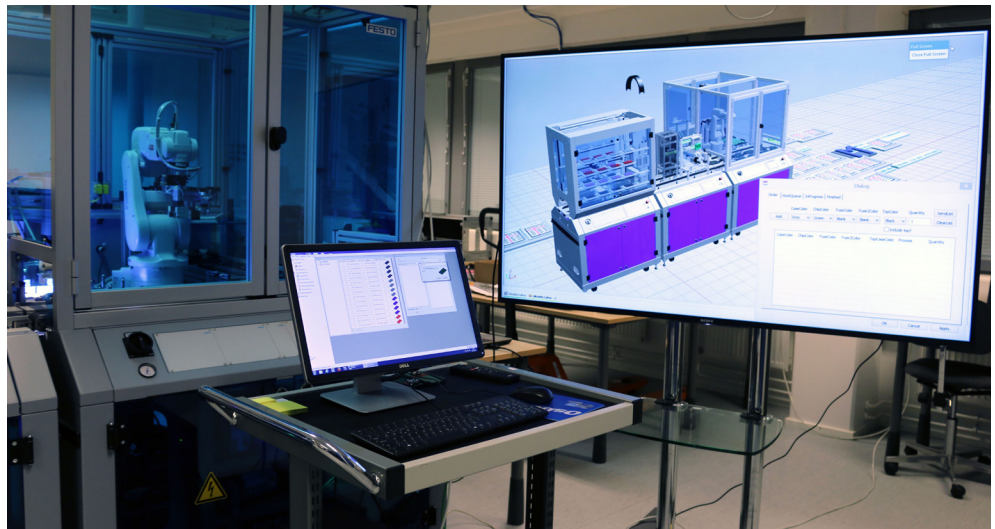
Seinäjoki University of Applied Sciences (SeAMK) is a multidisciplinary institution that plays a major role in education and research, development and innovation (RDI) in the region of South Ostrobothnia in Western Finland. SeAMK is an international university with 200 partner universities in 50 countries across the world.

The SeAMK research, development and innovation department is part of a regional university consortium, which also includes the Seinäjoki town council and the South Ostrobothnia region.

The Seinäjoki University of Applied Sciences offers a high-quality engineering education taught by qualified staff in modern laboratories with cutting-edge technology. The university uses its laboratories for teaching, testing services and research and development (R&D).

## Business challenges

The efficiency, flexibility and agility of product development and production



**“There are many players in the market offering individual components, but what appealed to us was the completeness of the offering; the integration of real and virtual worlds. That is really where our discussions started with Siemens Finland and IDEAL PLM.”**

Hannu Reinilä  
Head of the Degree Program  
in Automation Engineering  
and Information Technology  
Seinäjoki University of Applied  
Sciences (SeAMK)

processes are essential factors in Finnish manufacturing, which faces intense competition from low-cost nations, providing significant challenges for the country and its educational sector. Manufacturers need to rapidly create new, innovative products and produce them cost effectively to succeed in a global environment.

The Internet of Things (IoT) and digitalization offer Finnish manufacturers many new development opportunities. However, since small- and medium-sized enterprises (SMEs) have limited R&D resources and the technology is rapidly evolving, they often need a trusted partner, neutral advisor and trained staff to help them define how new technologies can be effectively applied in their business and engineering environments.

The opportunities for embracing the Industrial IoT and digitalization can only be realized if local manufacturers decide to become pioneers in this emerging technology. The purpose of the high-tech laboratories at SeAMK is to demonstrate the possibilities of technology and encourage enterprises to rapidly adopt them.

With a strong emphasis on the practical application of the design and engineering profession that matches industry requirements, SeAMK aims to provide its students with cutting-edge knowledge and skills that will make them highly employable

graduates who can help their employers modernize their engineering know-how.

#### **Identifying a need**

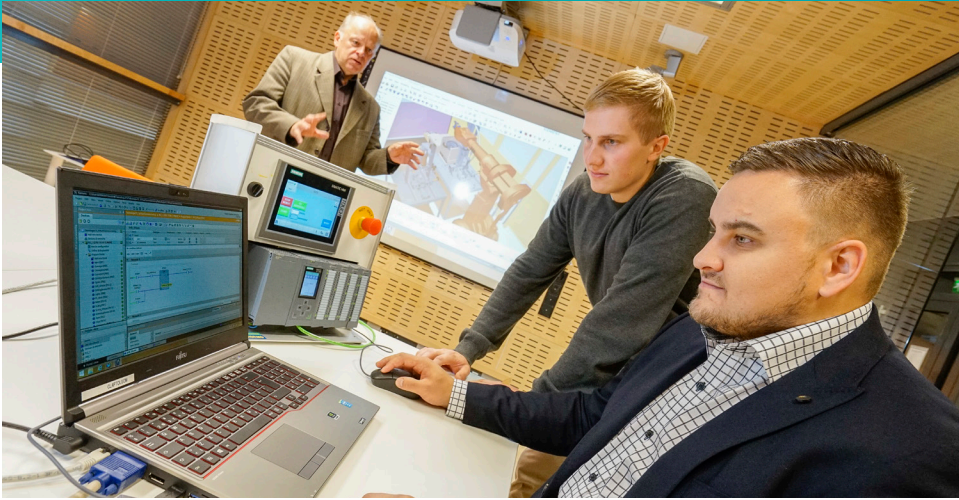
SeAMK has a long history of pioneering in the digital manufacturing domain. Several technical laboratories have been developed over the years and new developments are regularly taking place. One of the projects includes the virtual reality laboratory called Cave Automatic Virtual Environment (CAVE), in which products, structures and parts can be analyzed in 3D.

The CAVE room is used for visualizing computer-generated 3D structures, objects and worlds in a virtual space where the viewer is surrounded by five display walls of computer-generated virtual reality (VR). Models designed with 3D computer-aided design (CAD) programs come to life in the virtual space. The 3D models can be visualized by using the VR software tools.

Siemens, like SeAMK, recognizes that with an aging workforce and fewer engineers, and technologists entering the workforce, there is going to be a talent shortage. SeAMK identified the need to bring local industry and students even closer together in the field of digital design and manufacturing in 2013. The SeAMK Digital Factory was developed in partnership with Siemens in Finland and Siemens PLM Software partner IDEAL PLM by using the latest automation technologies and

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product lifecycle management (PLM) solutions to make the opportunities of the Industrial Internet and digitalization available to the students and the manufacturing sector. To validate the concept and develop the new initiative, more than 10 Ostrobothnian companies continuously provide invaluable information on their processes and requirements.

The SeAMK Digital Factory is an innovative, virtual learning environment for students, and a source of expertise for companies. It's a real-world implementation of Siemens' vision for digital enterprises, smoothly connecting major parts of the product and production lifecycle in a single environment.

In the virtual learning environment, students learn to operate machinery and use digital design programs to develop models and design production processes. Students recently developed fully functional robotized production cells.

In this center of expertise, companies' products and production lines can be designed, conceptualized, simulated and tested as 3D models. For example, the ergonomics of a manufacturing process may be tested. With the aid of virtually simulated factory workers, it is possible to assess how well the planned process would work from the standpoint of efficiency, ergonomics and safety.

#### **Long history with Siemens**

SeAMK has been a customer of Siemens in Finland for about 30 years and Siemens PLM Software through IDEAL PLM, Siemens PLM Software's Finnish partner for more than 20 years. The latter relationship started with Solid Edge® software for design. Solid Edge and NX™ software for CAD are currently the only CAD tools that are used to teach students at the Seinäjoki University of Applied Sciences.

*“We wanted a solution that allows a growth plan for extending our implementation to suit possible future needs; the Siemens solution fits perfectly with our needs.”*

Hannu Reinilä

Head of the Degree Program in Automation Engineering and Information Technology  
Seinäjoki University of Applied Sciences (SeAMK)

"We chose Solid Edge and NX as our main CAD software solutions for teaching our students as they are widely used in South Ostrobothnian companies," says Hannu Reinilä, head of the degree program in automation engineering and information technology at SeAMK. "We used to have other CAD solutions, but now it works much better with just Solid Edge and NX, because when students carry out assignments or internships with local companies, no time is wasted on learning the software the companies use. Our students can start their work straightaway." Siemens offers industrial strength software for academic use that spans the entire value chain.

South Ostrobothnia is a region with a strong focus on small- and medium-sized machinery and equipment manufacturers. When SeAMK was selecting partners for its planned digital factory initiative, there were several reasons it decided to partner with Siemens and IDEAL PLM.

First, SeAMK was looking for commercially established solutions that were readily available. Second, it was looking for solutions that were deployed in international organizations in Finland and abroad.

"We are always open to discussing projects to do with assignments, internships, summer jobs or graduate-level engineering job opportunities in Finland or abroad," says Reinilä. "We chose Siemens as its technology is available globally."

Third, SeAMK implemented Siemens control systems – 30 programmable logic controllers (PLCs) – and digital 3D models designed by staff or students. These 3D models and PLCs allow students to practice and experience different phases of digital production without bringing the physical mechanical machines and equipment to the laboratories.

In the SeAMK Digital Factory learning environment, students are able to connect the SIMATIC S7-1500 PLC via an OLE for Process Control (OPC) link to the

3D models in a digital simulation environment, such as Mechatronics Concept Designer™ software in the NX portfolio or Process Simulate and Plant Simulation in the Tecnomatix® portfolio, to allow the real PLC program to be tested with digital models. Programs are created in the totally automated integration (TIA) portal.

The program controls all the movements in the digital model, and the model in turn sends sensor signals back to the PLC. In this way the PLC programs can be tested before a machine or production line has even been produced. This in turn saves significant implementation time. This creates considerable savings as the students are able to carry out assignments using digital machines from the 3D model library without the university having to purchase mechanical demo equipment costing 50,000€ or more.

Furthermore, Siemens' vision and execution for the digital enterprise was highly appealing to SeAMK.

"Siemens is the only provider in the market extending digitalization from product development and operations through to production, thus offering a holistic automation solution," says Reinilä. "There are many players in the market offering individual components, but what appealed to us was the completeness of the offering; the integration of real and virtual worlds. That is really where our discussions started with Siemens in Finland and IDEAL PLM."

The SeAMK digital learning environment is a successful, real-life implementation of Siemens' vision for the future of manufacturing, offering emerging opportunities when the real and virtual worlds unite.

Digitalizing the learning environment allows SeAMK to gradually adopt new technologies. "We wanted a solution that allows a growth plan for extending our implementation to suit possible future needs; the Siemens solution fits perfectly with our needs," notes Hannu Reinilä.

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## Solutions/Services

Solid Edge

[www.siemens.com/solidedge](http://www.siemens.com/solidedge)

NX

[www.siemens.com/nx](http://www.siemens.com/nx)

Tecnomatix

[www.siemens.com/tecnomatix](http://www.siemens.com/tecnomatix)

## Customer's primary business

Seinäjoki University of Applied Sciences (SeAMK) is a multidisciplinary institution that has a major role in education and research, development and innovation (RDI) in the region of South Ostrobothnia in Western Finland. SeAMK has more than 5,000 students and 380 staff across 19 bachelor's degree and seven master's degree programs.  
[www.seamk.fi/en](http://www.seamk.fi/en)

## Customer location

South Ostrobothnia  
Finland

## Multiple award-winning results

Putting Siemens' vision into practice has been a great success at SeAMK. The implementation has created a highly successful and award-winning environment for university interaction between the school, industry and students, benefiting all in the process. Companies benefit from the know-how of the engineering graduates, and students are able to gain real-world experience through internships, projects and their final thesis. Students also gain highly relevant digital design and Industrial Internet of Things (IIoT) skills and work with the latest digital manufacturing methods that are vital to the industry. This enables them to have the skills they need to secure a job. Finally, SeAMK receives the latest industry knowledge from the field, acting as a continuous pool of first-hand development ideas and initiatives.

The SeAMK Digital Factory learning environment touches three engineering degree programs and the students can choose to study either the SeAMK Digital Factory or Industrial Internet module. Annually, more than 50 students graduate from these courses, and according to Reinilä, all of them are well positioned to secure a job after they graduate, benefiting the Finnish industry with the latest skills and knowledge, important assets for defining future success.

The SeAMK Digital Factory received several awards, including first prize in the RDI competition between Finnish universities of applied sciences for promoting digitalization, and a national first prize



award in the Productive Idea competition organized by Junior Chamber International (JCI) Finland.

Additionally, SeAMK has been recognized by the European Commission, which is funding IoT-Compass Hub, the only regional digital manufacturing innovation (RDMI) hub in Finland. This RDMI hub supports the profitable expansion of cyber physical systems and the IIoT for SMEs starting in the South Ostrobothnia region.

"The partnership with Siemens and IDEAL PLM has really been a great success for all," says Reinilä. "SeAMK has gained access to many events through Siemens and IDEAL PLM that would otherwise not be possible. We are very active in adopting new technologies; if we decide we need software or systems we certainly use them to their full capacity. Our learning environment has attracted a lot of interest from businesses and they contact us when they need advice. With us they get a good start."

## Siemens PLM Software

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[www.siemens.com/plm](http://www.siemens.com/plm)

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