

ACADEMIC

HTW University of Applied Sciences Berlin

Providing students with human-centered design and engineering skills to empower future engineers

Platform

Siemens Xcelerator

Business challenges

Provide industries with science and technology professionals

Close the engineering and IT education gender gap

Collaborate with industries to support realistic learning scenarios

Improve sustainable energy generation

Keys to success

Introduce international cooperation projects to enhance women's STEM competences

Employ studio-based learning using agile design and lean project management methods

Use NX CAD for all design work

Leverage Teamcenter to teach PLM and BOM management

Use Plant Simulation for factory design

Use Mendix to create online tools

Results

Provided students with human-centered design and engineering skills

Promoted technical expertise

HTW Berlin uses Siemens Xcelerator solutions to enable students to tackle future industrial challenges

Focusing on practical and international studies

While all industries are desperately in need of skilled professionals, particularly in science and technology, student numbers enrolling in science, technology, engineering and mathematics (STEM) subjects are waning. Simultaneously, women continue to be grossly underrepresented in engineering professions.

The Hochschule für Technik und Wirtschaft (HTW) University of Applied Sciences for Engineering and Economics Berlin is a young university with historic roots. It was established in 1994 after combining existing institutions such as the College of Economics, the Berlin Engineering School and the School of Engineering and Technical Drawing, which was started in 1874. HTW offers students practice-oriented degree programs with a wide range of career options in the fields of technology, computer science, business, law, culture and design.

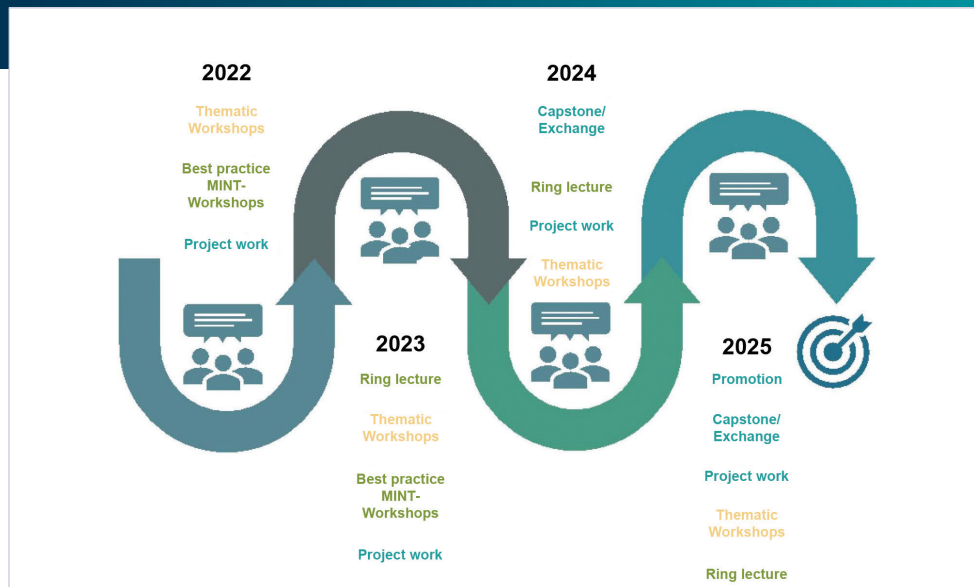


HTW offers transfer activities with practice-oriented teaching methods for engineering and computer science.

Results (continued)

Empowered future engineers to tackle critical industrial challenges

Created career opportunities for women in engineering and IT



The Global WiEIT students attend two three-week summer schools.

“Using NX for all CAD work from the second semester onward, HTW students find digging deeper into all aspects of PLM easy. They also find Siemens software supportive of the agile development methods used in studio-based learning.”

Helen Leemhuis
Professor for Design and
Factory Planning
HTW

Within their engineering courses and projects, HTW uses NX™ software for computer-aided design (CAD) and design verification and Teamcenter® software for product life-cycle management (PLM). Lecturers and students there also use Plant Simulation in the Tecnomatix® portfolio for factory planning and the Mendix™ Low-code platform for software application design. All of these are part of the Siemens Xcelerator business platform of software, hardware and services from Siemens Digital Industries Software.

“We have a strong focus on human-centered engineering design,” says Helen Leemhuis, professor for design and factory planning at HTW. “Using this flexible and powerful combination of Siemens software solutions enables our students to realize a comprehensive digital twin.”

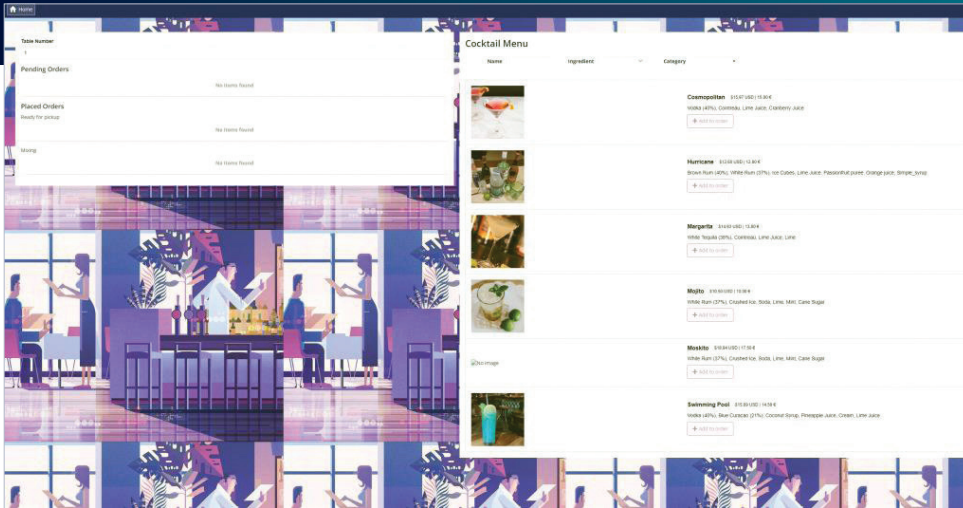
Benefiting from the Global WiEIT project

HTW’s transfer activities include knowledge and technology transfer, practical education and training for students and third mission activities. A beacon project in HTW’s portfolio of practical and international studies is called Global Women in Engineering and IT (Global WiEIT). In cooperation with the University of Technology Sydney (UTS) and Swinburne University of Technology in Australia, as well as industrial partners, Global WiEIT facilitates

innovative, practice-oriented teaching methods in engineering and computer science to motivate and empower women for careers in engineering and information technology (IT). It also creates female role models and expands the personal networks of those involved.

Over a four-year period, around 18 fifth-semester bachelor students, who usually go on to write their bachelor’s theses, participate in international cooperation projects enhancing sought-after STEM competences. These projects are centered around topics like Industry 4.0, the digital twin, cloud solutions, PLM and the digital factory. Funded by the German Academic Exchange Service and the Federal Ministry of Education and Research, students participate in practical and research-oriented courses and workshops to tackle real-life challenges provided by industry partners.

This education employs studio-based learning, combining various learning methods to mimic a real-world working experience and improve design, communication and teamwork skills. To promote self-directed learning, students get a personal working area within a common studio where they can organize everything from requirements management to scrum sprints. Professors only enter these areas if and when asked by the students.



Using Teamcenter, HTW students created a virtual bar environment for mixing nonalcoholic cocktails to understand BOM management.

“Within our Global Women in Engineering and IT project, students use Siemens software to acquire skills that all industries require to support their future product design and production.”

Dr. Ute Dietrich
Professor for Information
Technology and Systems
Engineering
HTW

During these projects, the international student teams work in close cooperation with staff from industry partners, thereby getting to know their processes, requirements and challenges.

“Using NX for all CAD work from the second semester onward, HTW students find digging deeper into all aspects of PLM easy,” says Leemhuis. “They also find Siemens software supportive of the agile development methods used in studio-based learning.”

These projects also include two three-week summer school classes each year, which

take place in Australia in February and Germany in July. There, students collaborate with international and interdisciplinary teams and attend international workshops using agile design and lean project management methods in a scrum team collaboration framework. This joint research is supplemented by the cooperative supervision of academic theses and a cooperative graduation program with the doctoral candidate and the supervising professors. Along with the availability of international scholarships, this program ensures that women can gain valuable international experience without necessarily having to spend several months abroad.



Using Siemens software, HTW students gain deeper insights into innovative and future-relevant topics such as Industry 4.0, the digital twin and system lifecycle management.”

Dr. Ute Dietrich
Professor for Information Technology and Systems Engineering
HTW



Using this flexible and powerful combination of Siemens software solutions enables our students to realize a comprehensive digital twin."

Helen Leemhuis
Professor for Design and Factory Planning
HTW

Mario's Carpentry

New User

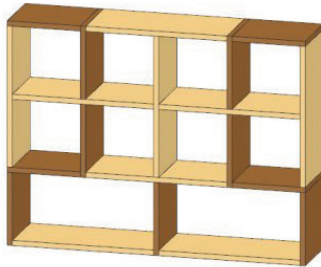
Design the shelf tailored to your space below!

Shelf Configurator

Resume Previous Order

Do you have saved configurations? Recover them below!

Saved Selections



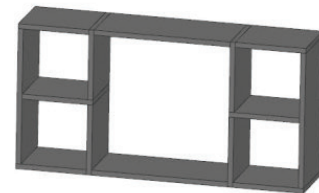
Welcome to Mario's Shelf Configurator!

Here on Mario's Shelf Configurator, you have many shelf configurations of a variety of shapes, sizes and colours designed to fit your space and purpose. Whether you need a shelf for your living space, bedroom, study or garage or more, our shelves are durable yet stunningly aesthetic for your usage.

How to use the configurator?

1. Select a length and height to suit your space
2. View the stock design options available to you
3. Choose one or multiple colours for the timber boards
4. Confirm selection and add to cart
5. Go back for more if you want more shapes and sizes to add to your shelf system and add to cart!

Any special custom requests can be requested on our configurator page. Happy designing!



HTW students and their Australian colleagues designed the digital twin of a modular shelf system and an online configurator.

Tackling practical projects with industry partners

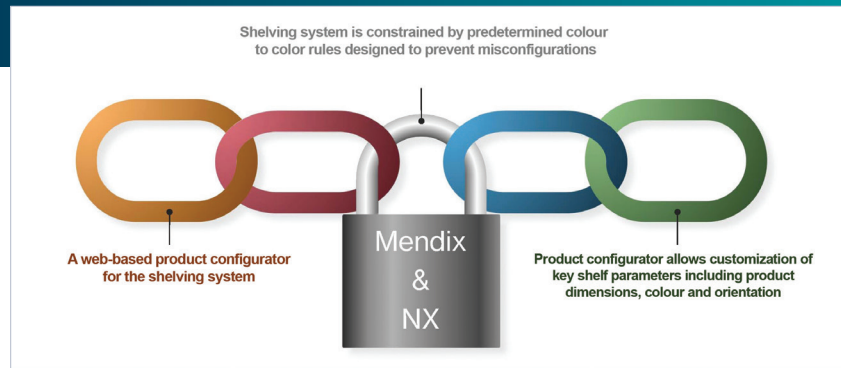
The projects HTW students and their Australian colleagues pursue jointly are not industry-specific. However, the common denominator is to build a digital twin as a key component in smart environments.

"HTW has anchored the digital twin and provided a better start for women when teaching future generations of engineers," says Doctor of Engineering, Ute Dietrich, professor for information technology and systems engineering at HTW. "Using Siemens software, HTW students gain deeper insights into innovative and future-relevant topics such as Industry 4.0, the digital twin and system lifecycle management."

For example, some projects focus on data use and communication. One team designed a virtual cafeteria for the industry partner's staff to meet while working from home during the pandemic. Another group designed an interface for a comprehensive asset administration shell to provide product data from dispersed systems in real time during the product's lifecycle. Additionally, during the required Teamcenter training, they created an environment for mixing nonalcoholic cocktails to get acquainted with bill-of-materials (BOM) management.

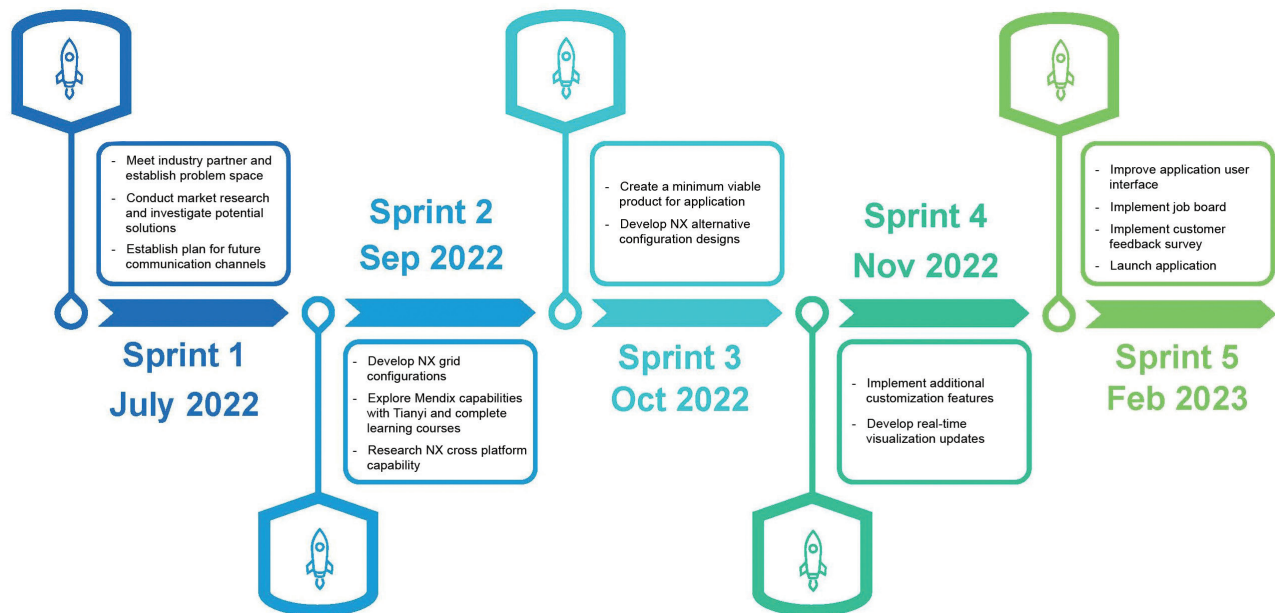
For another project, one group created the digital twin of a system for administrating trainers and students and for the industry partner's course quality evaluations, which they use to identify potential improvements. Another implemented an IT solution to handle processes and data management for capturing various product lifecycle management phases of battery cells, as these need to be recorded in a machine-readable manner in a digital battery passport. Further, another team researched ways to provide content moderation support for groups on end-to-end encrypted online platforms to automatically identify and filter out misogynistic or otherwise toxic content to uphold a respectful, integrative discourse.

In other projects, the international student teams tackle new challenges concerning industrial production. One group developed a concept and connectors to integrate legacy machine tools and their digital twin in Teamcenter using Opcenter™ software, which is also part of the Siemens Xcelerator business platform, for manufacturing operations management (MOM). Another



Students designed a modular shelf system digital twin, PLM and online configurator using NX, Teamcenter and Mendix, respectively.

group designed a flexible robotic end-effector to automatically pick up and place 2D and 3D carbon fiber preforms based on CAD or real-time production data. Additionally, as model-based definition (MBD) increases in importance, one team created a software solution to analyze CAD geometries and tolerances in milling processes and automatically provide product manufacturing information (PMI) for 3D models to facilitate feature-based machining. Further, for a German motorcycle manufacturer, one team helped optimize their manufacturing process for connecting rods using data analysis based on historic and live process data.



Students collaborate with international and interdisciplinary teams and use agile design and lean project management methods in a scrum team collaboration framework.

Solutions/Services

NX

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

Teamcenter

[siemens.com/teamcenter](https://www.siemens.com/teamcenter)

Plant Simulation

[siemens.com/plantsimulation](https://www.siemens.com/plantsimulation)

Mendix

[siemens.com/mendix](https://www.siemens.com/mendix)

Opcenter

[siemens.com/opcenter](https://www.siemens.com/opcenter)

Customer's primary business

Established in 1994, HTW Berlin offers education in the fields of business, engineering, computer science, design, culture, health, energy and environment, law, construction and real estate. With 295 professors, 800 assistant lecturers and about 14,600 students across two campuses, HTW is the largest university of applied sciences in Berlin. www.htw-berlin.de/en

Customer location

Berlin

Germany

Making real-world improvements

In one project with a German furniture manufacturer, the students used NX to design the digital twin of a modular shelf system, Teamcenter for PLM and Mendix to create an online configurator. While the shelves are built from only two basic components, these need holes drilled in various patterns for each configuration. After automatically checking each customer-defined configuration for feasibility, the system returns a manufacturing BOM with all the required boards, including the necessary drill holes.

“Within our Global Women in Engineering and IT project, students use Siemens software to acquire skills that all industries require to support their future product design and production,” says Dietrich. “Our alumni know how to use system-driven engineering concept development after requirements elicitation to create and build a digital twin and consider products, production systems or services over their product’s lifecycle.”

Siemens Digital Industries Software

Americas 1 800 498 5351

Europe 00 800 70002222

Asia-Pacific 001 800 03061910

For additional numbers, click [here](#).

[siemens.com/software](https://www.siemens.com/software)

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