Léonce Vieljeux High School
Preparing students for Industry 4.0

Business challenges
Prepare students for Industry 4.0
Develop knowledge to meet industry needs and realities

Keys to success
Experience in the study and design of automated systems
Partnership with Siemens
Access to the latest Siemens solutions

Results
Designed automated systems more rapidly and efficiently
Won awards in academic competitions
Shared experiences with other French and international schools
Successful employment for graduates

Léonce Vieljeux High School develops industrial technology skills in partnership with Siemens

Education in industrial science and technology
Located near the famous port of La Rochelle, France, the Léonce Vieljeux General and Technological High School (Lycée Général et Technologique Léonce Vieljeux) is historically renowned for its scientific and technological education. The institution prepares students for the “General” and “Industrial Science and Technology and Sustainable Development” (STIDD) baccalaureate diplomas, and provides post-baccalaureate training, including preparation for competitive entrance examinations into higher education institutes and vocational training certificates (BTS).

The high school has 3 BTS departments, one of which is dedicated to the Design and Production of Automatic Systems (CRSA). This BTS is highly appreciated by small- to medium-sized enterprises and institutions that use automated machines. Drawing on their experience in the study and design of automated systems for businesses located in France’s Poitou-Charentes region, the BTS CRSA teaching staff has been involved for a number of years in the Digital Factory, in partnership with Siemens.

www.siemens.com/nx
Preparing students for Industry 4.0

In a highly competitive international field where environmental, human and economic concerns are at the forefront, the growing demand for improved performance of automatic systems and automated equipment has led to a number of developments that demand extensive knowledge of conventional technologies, as well as high-level competencies in new technologies.

In the framework of the partnership, students in the CRSA department gained access to the latest Siemens solutions to design the automated systems of tomorrow more rapidly and more efficiently. They fully benefit from synergies between Siemens PLM Software solutions and Siemens automation solutions.

Johans Besse, a teacher who specializes in mechanical engineering and automatic controls, has been actively involved in establishing the partnership with Siemens. As he enthusiastically points out: “Our students are the first in France to be able to implement the concepts inherent in Industry 4.0.”

Bringing together mechanical engineers, electrical engineers and automation experts

The team of teachers working in the CRSA department, comprising Johans Besse (Mechanical Engineering and Automatic Controls), Philippe Hury (Mechanical Engineering) and Thierry Florion (Electrical Engineering), summed up the challenge for students thus: “Until now, there was no ‘collaborative work’ as such: the studies in mechanical design usually ended in April, leaving somewhere between six weeks and two months to focus on automatic controls. Anyone familiar with BTS projects will tell you that the end of the academic year is always hectic. The final adjustments and changes made to the mechanical part meant that the electrical engineers and automation experts were unable to fully optimize their work.”

Since the signing of the partnership in January 2012, second-year students have been able to use Siemens solutions to accomplish their industrial project: Mechatronics Concept Designer from the NX production suite for the design of the operative part, and the Totally Integrated

“Our students are the first in France to be able to implement the concepts inherent in Industry 4.0.”

Johans Besse
Teacher
Mechanical Engineering and Automatic Controls
Léonce Vieljeux General and Technological High School
Automation (TIA) Portal for the design of the control part, where both solutions communicate via an Object Linking and Embedding (OLE) for Process Control (OPC) server.

The mechanical engineer uses Mechatronics Concept Designer to animate the virtual model and bring to life the machine process right from the design stage. Mechatronics Concept Designer associates rigid bodies, collision bodies, conveyance surfaces or articulations with the CAD parts. Position sensors and operations can also be added to the model, which, with their programmed characteristics, make it possible to organize the operating cycle via the sequence editor. After the design phase, the automation expert can use Mechatronics Concept Designer to animate the so-called virtual twin with the real physical controller that will eventually be used on the actual machine.

“From a learning perspective, we wanted to make sure that the tools were easy to come to grips with, and suited to the skills of the future CRSA technician,” says Besse. “And the experience has been a success: this year, a group of students in the CRSA department used this approach to completely design a sorting system using radio frequency identification for the SPEN Systèmes company.”

Collaborative design and realistic simulation
By creating a model, the mechanical engineer can present his or her concept to the project’s other participants via a collaborative framework. The automation expert, who usually steps in at the end of the chain and thus has to wait for the others to complete their work, can now work in parallel, and share his or her expertise on the machine’s animation right from the start and detect problems upstream. “This leads to considerable time gains during the preliminary design phase, since by simulating a draft of the system’s operative part, we can validate its behavior, launch programming development in parallel, and choose the key components,” explains Hury.

“Mechanical Concept Designer means we can assess several design strategies,” Florion adds. “This is essential from a learning perspective, since the students are involved in their own choices. In addition, the solution can introduce random factors, which helps to minimize design errors and test all possible scenarios, without the risk of upsetting the other stakeholders.”

“Siemens is one of the world leaders for automation systems: this kind of partnership can only benefit the students. The studies taken correspond to industry’s present-day realities and needs, and demonstrate how our BTS CRSA students are now in a position to meet businesses’ needs.”

Johans Besse
Teacher
Mechanical Engineering and Automatic Controls
Léonce Vieljeux General and Technological High School
A motivating approach for students
The students are delighted and proud to have participated in this successful pilot experience. The following are quotes from CRSA students.

- “When we presented our project, the businesses were really impressed by the overall digital approach. Few students are fortunate enough to benefit from access to this level of technology.”
- “Working on a virtual model means you can easily test a number of solutions: all you have to do is to vary a few parameters, and it’s done!”
- “Being able to simulate random factors and breakdowns is very reassuring. It means we can advance with the project in a calm and composed manner.”

The future is bright
The Lycée Vieljeux high school benefits from recognized experience in the study and design of automated systems. Highly active in the field of robotics, the establishment distinguished itself on two occasions this year. First, the school’s robotics club won the Trophées de Robotique robotics award organized by Planète Sciences to become European Champion, and secondly, the school’s CRSA department qualified for the national final of the Olympiades de la robotique industrielle FANUC (FANUC industrial robotics Olympics).

In partnership with Siemens, the CRSA department is now involved in the development of the Digital Factory. Using the latest design and programming tools, this collaboration serves to simulate automated machines before their manufacture, via a serious games-like approach. “We are proud to bring this all-new approach to other French schools and to share our experience with them,” says Besse. “On a European level, we have begun to exchange with the Seinäjoki University of Applied Sciences (SeamK) in Finland, which has implemented the MCD solution. This marks an international opening.”

Recently, the Vieljeux school’s CRSA department put in place a Siemens certification. This additional qualification represents a significant advantage when students are looking for first-time employment. “Last year, two students successfully took up the challenge, and promptly went on to find jobs in September. This year, five students have taken the exam, which comprises two parts: a questionnaire directly on the Siemens website, and a practical test. Four out of the five passed and are now certified.”

“Siemens is one of the world leaders for automation systems: this kind of partnership can only benefit the students,” Besse concludes. “The studies taken correspond to industry’s present-day realities and needs, and demonstrate how our BTS CRSA students are now in a position to meet businesses’ needs.”