

ACADEMIA CASE STUDY

National Technical University of Ukraine “Igor Sikorsky Kyiv Polytechnic Institute”



Challenge:

Ukraine's Kyiv Polytechnic Institute needed to teach its mechanical engineering students the right technical skills in applied mechanics and materials engineering for the aerospace industry.

Solution:

The university has incorporated Dassault Systèmes' **3DEXPERIENCE** platform and its design, analysis, and manufacturing applications in its mechanical engineering curriculum to support the needs of aircraft companies in Ukraine and abroad.

Benefits:

Students graduate with theoretical and practical knowledge of 3D modeling and manufacturing, product lifecycle management and real-time collaboration, providing them with critical skills for aerospace engineering.

PREPARING STUDENTS TO MEET NEW CHALLENGES

As appliances, cars, planes, and industrial equipment become more powerful, efficient and connected, engineering students need to enter the workforce with applied mechanics and materials engineering skills. This has been the objective of National Technical University of Ukraine Igor Sikorsky Kyiv Polytechnic Institute (NTUU "Igor Sikorsky KPI") since it was founded in 1898.

"Our university is the largest technical higher education institution in Ukraine," said Andrey Babenko, head of the department of dynamics and strength of materials at NTUU. "We have 19 faculties, 9 educational and scientific institutes with several R&D and scientific centers dispensing bachelor, specialist, master and PhD-level training. What differentiates us from other universities is the level of high teaching standards we've maintained over the years, which has positioned us in the top 4%¹ of technical universities in the world. Our institution cooperates with many renowned machine-building companies and aircraft manufacturers such as Progresstech, Boeing, Antonov, Gidrosila, HAAS, and FESTO. They tell us what they need and we adapt our technologies and teaching methods to accommodate them. As a result, our students easily find work here and abroad once they enter the job market," he said.

Over the past few decades, NTUU "Igor Sikorsky KPI" has been adding courses on CAD/CAM/CAE/CALS solutions to its curriculum for design, manufacturing, simulation and engineering analysis of technical systems and structural elements. "Modern day needs call for modern tools," Andrey said. "Many of the world's major aircraft manufacturers have been using Dassault Systèmes' applications for years. Without basic knowledge, for example, in 3D modeling using CATIA,

engineering analysis with SIMULIA and digital manufacturing with DELMIA along with practical experience with these applications, students who want to work for these companies will simply not be hired."

EDUCATIONAL PROGRAM IN TECHNOLOGY

The university has been teaching CATIA at its Institute of Mechanics and Mechanical Engineering and the Faculty of Instrumentation Engineering since 1998. "Today we use the **3DEXPERIENCE**® platform and cover topics such as knowledge-based engineering and the importance of corporate best practices and methodologies as a way to shorten development time and preserve company know-how," Andrey said.

"With the **3DEXPERIENCE** platform, students store data in a centralized database that other students from different classes can use on school projects and practical exercises. We combine theoretical training and practical design exercises that the students must successfully complete to demonstrate their understanding of the concepts," he said. "They then complete a bigger, more ambitious project at the end of their studies. We also feature CATIA 3D design in our applied mechanics curriculum, which specializes in dynamics and strength of materials. The cases we study in class represent the types of situations students will encounter when they enter the job market."

NPO Solid, a local business partner, implemented the Dassault Systèmes' solutions at NTUU "Igor Sikorsky KPI". "They provided the teaching staff with training and support to get



"Companies have an obligation to satisfy their customers' demand for quality. It all begins with skilled employees and the right technology, which is why the Dassault Systèmes' applications are an essential component of our students' learning process."

— Andrey BABENKO, head of the department of dynamics and strength of materials, NTUU "Igor Sikorsky KPI"

¹ Source: International rating QS and Webometrics

them up to speed and continue to support us if we have any questions,” Andrey said. “We are very pleased with their services.”

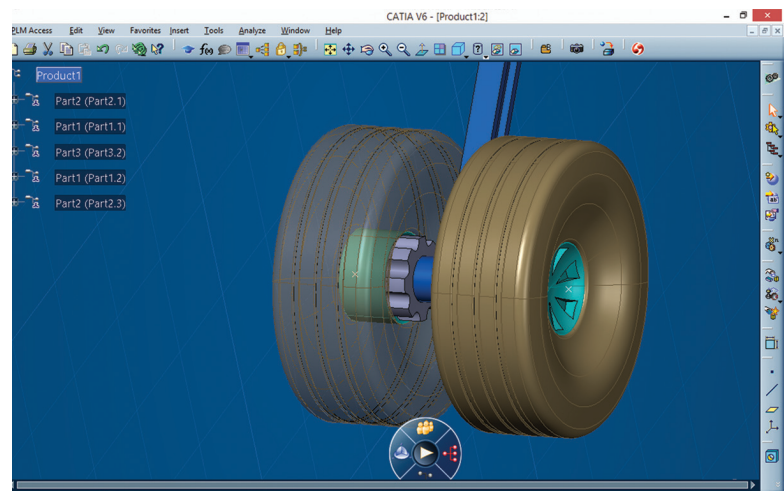
DIGITIZING A PRODUCT’S LIFECYCLE

Before engineering students graduate from NTUU “Igor Sikorsky KPI”, the university makes sure they are proficient in 3D modeling techniques and that they master the notion of product lifecycle management. “Whether it’s a plane, industrial equipment or a car, no company can deny the importance of managing the end-to-end life of the product from initial requirements to disassembly and disposal at the end of its life,” Andrey said. “Digital simulation improves product performance and an employee’s productivity as they can quickly create different design alternatives and simulate the product in its environment before building the first physical prototype or setting up an assembly line. In this way, digitization helps companies save time and money while improving the quality of their products,” Andrey said.

Using the **3DEXPERIENCE** platform, students discover the importance of collaboration. “Designing products is a collective effort of many specializations,” Andrey said, “which is why students first need to experience collaborative design methods in school. With ENOVIA and CATIA, they access the 3D model and exchange ideas and make changes all in real time,” he said. “They learn to use dashboarding, available in the **3DEXPERIENCE** platform, to exchange information using social media with their peers to share ideas and design methods. It’s a great way to improve their creative potential.”

Workflows and processes are capitalized in ENOVIA, which is a fundamental prerequisite of efficient project management. “Project stakeholders are automatically informed that a task awaits them so that schedules are respected while project leaders have full traceability, which allows them to monitor who did what and what still needs to be done,” Andrey said. “Moreover, best practices and intellectual property can be capitalized for use in future projects.”

The school’s engineering departments also incorporate manufacturing simulation in their courses. “Predicting errors before they happen at the manufacturing stage is essential to reducing costs and meeting delivery deadlines,” Andrey said. “With DELMIA, students learn to assemble and simulate a production process to see if products are machined correctly, that there are no interferences, and that assembly lines are properly set up and operating to full capacity. These are all challenges that modern companies face and students that master these tools have a competitive advantage when looking for a job.”



Top image: Students working on the **3DEXPERIENCE** platform

Bottom image: DMU of component

National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute"

Ukraine's largest technical higher education institution and one of Europe's leading educational institutions.

Programs: Bachelor's, master's and PhD-level mechanical engineering classes

Students and staff: 25,000 students, 1,800 teaching staff

Location: Kiev, Ukraine

For more information
www.kpi.ua/en

Focus on NPO Solid

Established in 1998, NPO Solid is the official distributor of Dassault Systèmes' applications in Ukraine. The company delivers implementation and product lifecycle management support to design and engineering companies that develop high-technology products. NPO Solid tailors solutions to its customers' needs and delivers training, tooling design, develops postprocessors and supports customers with their CNC programming.

For more information
www.solid.kiev.ua



In 2016, NTUU "Igor Sikorsky KPI" inaugurated an educational and scientific center jointly created with Boeing and Progresstech-Ukraine. "The center's objective is to enhance the proficiency of mechanical engineering graduate students to prepare them for employment in aircraft construction companies like Progresstech and Boeing," Andrey said. "We recently added two classes to teach design and analysis methodologies for aircraft design. The center also features bachelor-level classes in applied mechanics, mechanics of structures and materials, elasticity theory, theory of oscillations and stability."

An example of cooperation between the university and its aerospace industry partners is the organization of a master class during which students and professors have the opportunity to participate in the development of an entire aircraft from concept and preliminary design to the completion of the digital model. "We use the 3DEXPERIENCE platform and its design and simulation applications to develop this model," Anderiy said. "The class is intended to provide students with practical experience that will be of help when they encounter similar situations on the job."

"In our over 100 years of existence, we've strived to provide our students with top-level training that will prepare them for the responsibilities that await them in their future careers," Andrey said. "Companies have an obligation to satisfy their customers' demand for quality. It all begins with skilled employees and the right technology, which is why the Dassault Systèmes' applications are an essential component of our students' learning process," he said.

Our 3DEXPERIENCE® platform powers our brand applications, serving 12 industries, and provides a rich portfolio of industry solution experiences.

Dassault Systèmes, the 3DEXPERIENCE® Company, provides business and people with virtual universes to imagine sustainable innovations. Its world-leading solutions transform the way products are designed, produced, and supported. Dassault Systèmes' collaborative solutions foster social innovation, expanding possibilities for the virtual world to improve the real world. The group brings value to over 210,000 customers of all sizes in all industries in more than 140 countries. For more information, visit www.3ds.com.

