PRODUCT DESIGN AND DIGITAL DEVELOPMENT

Digital Automation Engineering
AA. 2024-2025

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Link to personal page

Objectives

- Design an industrial automation system
- Understand the main phases of the development process
- Use digital tools to develop the automation system
- Focus on industrial **robots** and **cobots**

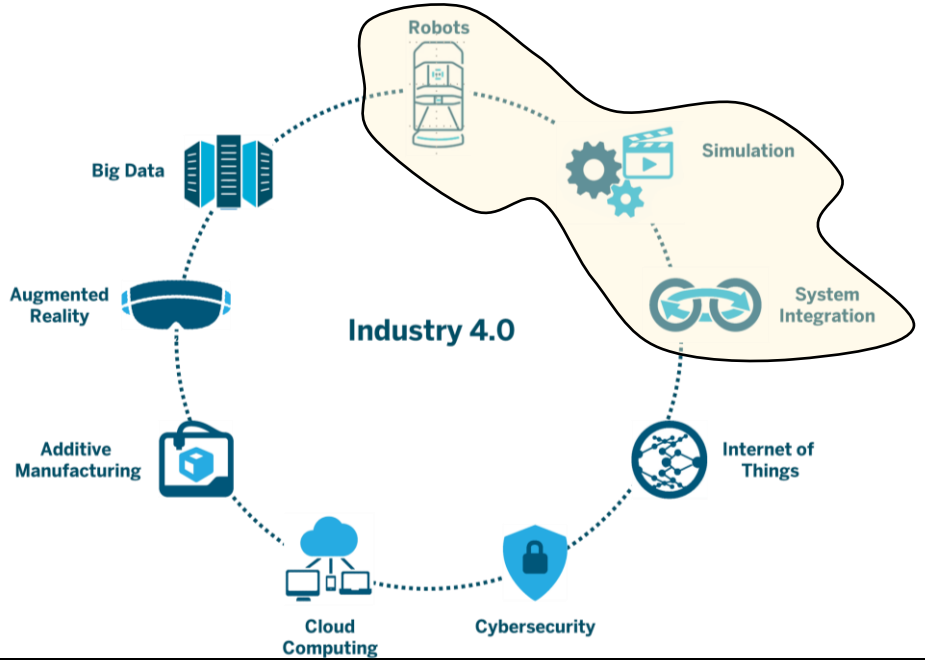
Course structure

- 6CFU → *3CFU **Theory** + 3CFU **Lab***
- *Learning by doing approach*

Theoretical modules

1. Methods and tools to support the design and development of industrial products and automation systems
2. Conceptual design and embodiment design
3. Geometry representation
4. Virtual Prototyping techniques
5. Information management in the product life cycle

Lab Exercises → hands-on experience on industrial case study



Lab Exercises → Design of a novel industrial automated cell

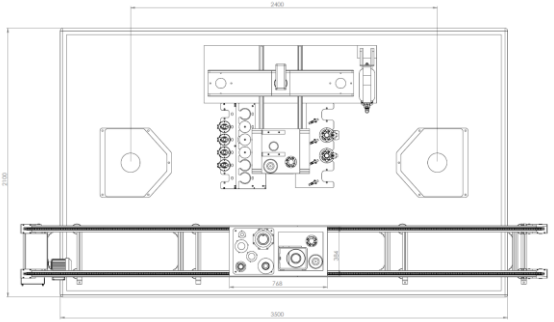
INPUT

Product requirements

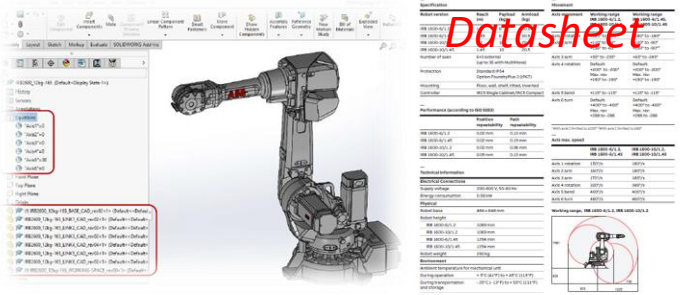
Case study provided by a local company

Specs

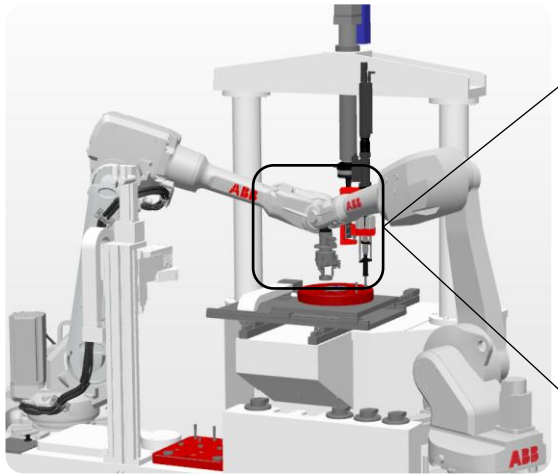
Lab 01/02 – *Initial cell design and layout drafting*

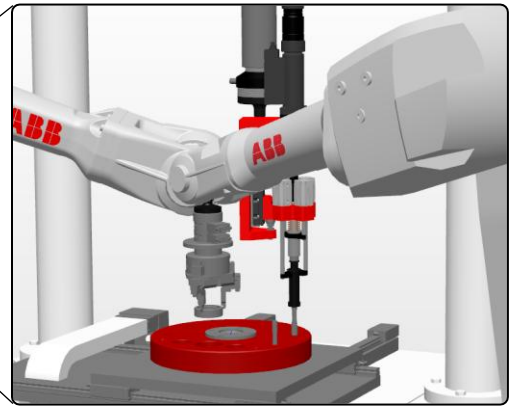


Lab 03/04 – *CAD modeling and validation*

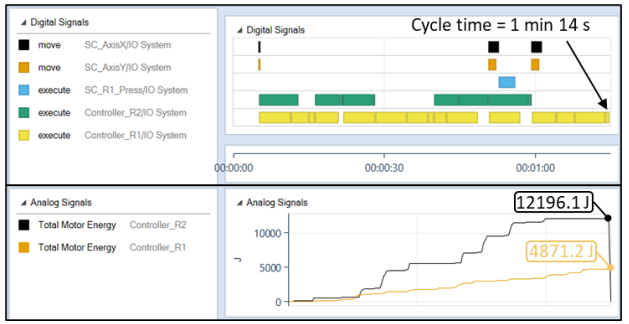


Lab 05/08 – *Virtual prototyping and performance simulation*





Collision zone



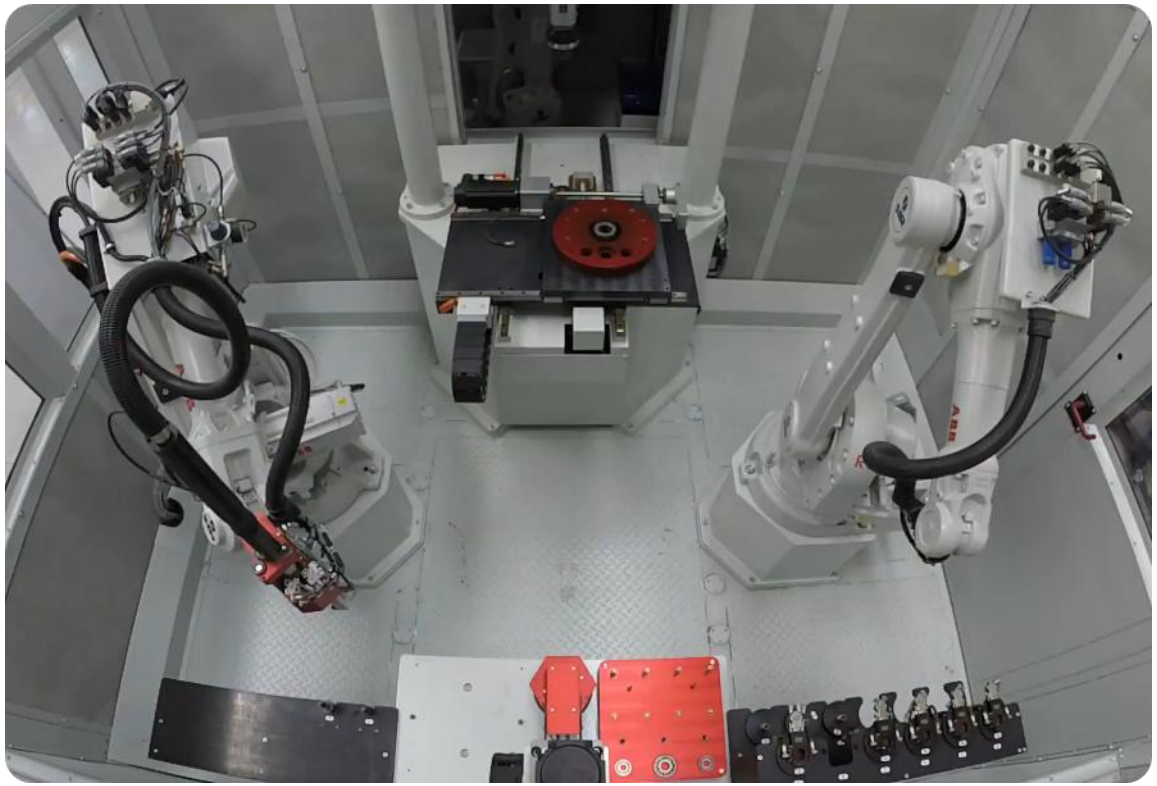
- Signal monitoring
- Logic sequencing
- Cycle time optimization
- Energy consumption

Technical Report

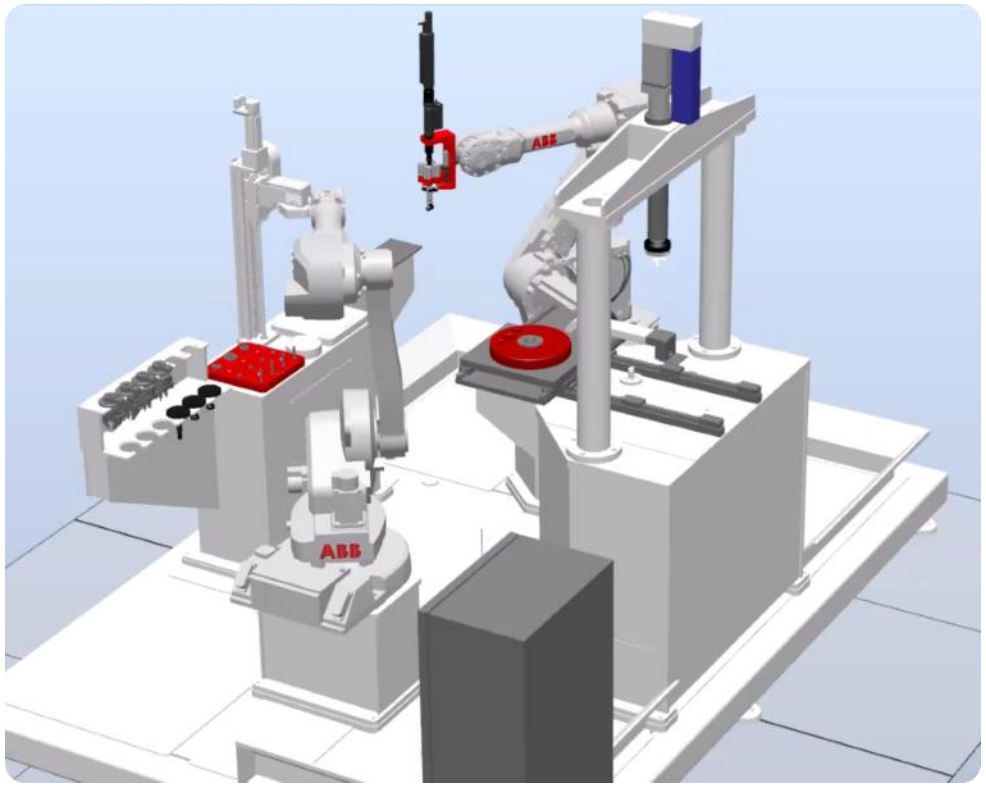
OUTPUT

Example of automated cell (video)

Physical prototype



Virtual prototype



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Extended simulation visible at this link

Timeline

Industrial seminar(s)

Course Start (02/2024)

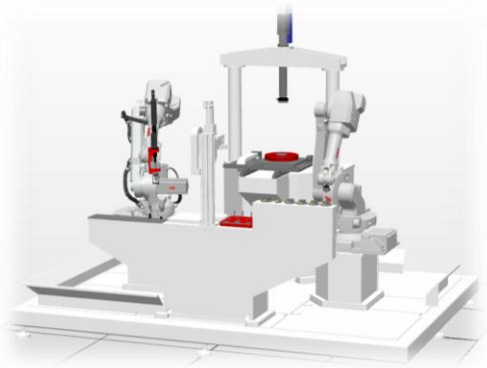
Course End (06/2024)

Theoretical Lessons

Training on CAD and virtual prototyping software

***Training on the job* (workgroup)**

Seminar for case study assignment



Verification of learning

Step 1: Submit files and **technical report**

Step 2: Oral Exam

- Presentation of group project (2-3 people) + discussion **50% of final score**
- 2-3 questions related to theoretical topics **50% of final score**