CM1 Digital Technologies for Product Development

LEARNING OBJECTIVES

The Digital Technologies for Product Development track aims to train professionals with a systemic approach to industrial product development. First-year courses will enable students to understand digital solutions to address the main aspects of industrial product design and life cycle. Second-year mandatory courses deal with the digital twin paradigm and innovative technologies of eXtended Reality and their engineering applications, leading students to acknowledge their potential. Through elective courses, students can deepen their knowledge in increasingly relevant multidisciplinary fields within mechanical engineering.

PRE-REQUISITES

Students of the Digital Technologies for Product Development track should not meet specific requirements. However, basic mathematics, physics, and computer science skills and a good knowledge of design methods and tools are recommended. The track includes activities concerning resolving complex, interdisciplinary, and multidisciplinary projects.

LEARNING OUTCOMES

From the system architecture's conceptual definition to the life cycle's integrated vision, the Digital Technologies for Product Development track aims to train future engineers to proficiently use the enabling digital technologies of information management, modelling, visualization, and simulation to address complex theoretical and applicative problems from the most traditional mechanics to the cutting-edge applications.

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JOB OPPORTUNITIES

After graduating, students will be able to pursue their careers in different fields, such as automotive, electronics and automation, healthcare and medical industry, manufacturing, mechanics, and installation, with various roles: R&D engineer, technical manager, project manager, head of product development, IT service manager, CAD/CAM expert, head of digital transformation, simulation analyst, PDM/PLM expert, consultant.

PARTNER UNIVERSITIES

Within the Digital Technologies for Product Development track, students will benefit from collaborations with the most prestigious international universities to carry out their thesis in the last year. To mention a few examples: Katholieke Universiteit Leuven (KU Leuven, Belgium), Shanghai Jiao Tong University (SJTU, China), Tsinghua University (China), Technische Universität München (TUM, Germany), Blekinge Tekniska Högskola (BTH, Sweden), Chalmers Tekniska Högskola (Chalmers, Sweden), Eidgenössische Technische Hochschule Zürich (ETH Zurich, Switzerland), Technische Universiteit Delft (TU Delft, The Netherlands), Technische Universiteit Eindhoven (TUe, The Netherlands), Imperial College London Imperial (UK), Georgia Institute of Technology (Georgia Tech, USA), and Virginia Tech (VT, USA).

CM1 Digital Technologies for Product Development

1 YEAR COURSES
60 ECTS

45 ECTS

	ECTS
Measurements for Mechanical Engineering	5
Advanced Dynamics of Mechanical Systems	10
Advanced Machine Design	10
Methods and Digital Tools for Product Development	10
Advanced Manufacturing Processes B	5
Production Management	5

10 ECTS

	ECTS
Reverse Engineering and Surface Modeling for Engineering Applications	10
Design and Analysis of Experiments and Response Surface Methodology	10

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5 ECTS

	ECTS
Computational Fluid Dynamics - Fundamentals	5
Finite Element Simulation for Mechanical Design	5
Topology Optimisation	5
Reverse Engineering*	5
Surface Modeling for Engineering Applications*	5
Additive Manufacturing B	5
Quality Data Analysis B	5
Product Life Cycle Management	5
Materials and Simulation Tools for Sustainable Processes	5
High-Tech Startups: Creating and Scaling Up	5

*Selectable if not selected before.

CM1 Digital Technologies for Product Development

2 YEAR COURSES

40 ECTS + 20 ECTS Master's Thesis

10 ECTS

	ECTS
Product Digital Twin	5
XR Applications for Engineering	5

5 ECTS

	ECTS
LAB - Haptics and Multisensory Interaction in Virtual and Augmented Reality	5
LAB - Human Modelling In Engineering	5
LAB - Virtual and Physical Prototyping	5

5 ECTS

	ECTS
Open Couse	5

CM1 Digital Technologies for Product Development

20 ECTS

	ECTS
Advanced Human Machine Interfaces	5
Extended Reality for Creativity in Design	5
Edge-Device Based Measurements and Industry IoT	5
Vision Based 3D Measurements	5
Machine Learning for Mechanical Systems	5
Digital Twin for Health and Usage Monitoring	5
Topology Optimisation*	5
Intellectual Property and Patents in Innovation	5
Methods for Complex Shape Generation	5
Creativity for Sustainable Design	5
Digital Factory	5
Digital Twins of Production Systems B	5
Digital Manufacturing	5
Materials and Simulation Tools for Sustainable Processes	5
High-Tech Startups: Creating and Scaling Up	5

*Selectable if not selected before.