

# Digital Technologies for Product Development

CM1



# Contacts



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## Track description

The track Digital Technologies for Product Development aims to train students with a systemic approach oriented to industrial product development. Students will be able to proficiently use the enabling digital technologies of Industry 4.0 and 5.0 for information management, modelling, visualisation, and simulation.

The track courses include design and laboratory activities with a fundamental educational role to provide students with practical experimenting with methodologies and tools guided by teachers and tutors.





# Skills

Students will learn how to:

- apply digital technologies and digital data management in industrial engineering (with the most advanced AI algorithms for design automation);
- exploit the potentialities of virtual, mixed, and augmented reality for advanced 3D modelling and reverse engineering;
- master virtual and physical prototyping tools for the design, simulation, testing and validation;
- integrate human factors (such as ergonomics) in the design.



# CM1: Core Courses

Course Title	YEAR	SEM	ECTS	ECTS GROUP
Measurements for Mechanical Engineering	1	2	5	5
Advanced Dynamics of Mechanical Systems	1	1	10	10
Advanced Machine Design	1	2	10	10
Digital Design Methods	1	1	10	10
Advanced Manufacturing Processes B	1	1	5	5
Production Management	1	2	5	5



# CM1: Track Specific Courses

Course Title	YEAR	SEM	ECTS	ECTS GROUP
Reverse Engineering and Surface Modeling for Engineering Application	1	2	10	10
Design and Analysis of Experiments and Response Surface Methodology	1	2	10	
Product Digital Twin	2	1	5	10
XR Applications for Engineering	2	1	5	
<b>Elective courses</b> (Additive Manufacturing B, Computational Fluid Dynamics - Fundamentals, Finite Element Simulation for Mechanical Design, High-Tech Startups: Creating and Scaling Up, Product Life Cycle Management, Quality Data Analysis B, Reverse Engineering, Surface Modeling for Engineering Applications, Sustainable Materials for Innovative Processes, Topology Optimisation)	2	1-2	5	5
<b>Elective courses</b> (Advanced Human Machine Interface For Engineering, Digital Factory, Digital Manufacturing, Digital Twin for Health and Usage Monitoring, Digital Twins of Production Systems B, Edge-Device Based Measurements and Industry Internet of Things, High-Tech Startups: Creating and Scaling Up, Machine Learning and Model Identification for Mechanical Systems, Methods for Complex Shapes Generation, Simulation Tools for Materials and Processes, Topology Optimisation, Vision Based 3D Measurements)	2	1-2	5	20
<b>Lab course</b> (Haptics and Multisensory Interaction in Extended Reality, Human Modelling In Engineering, Virtual And Physical Prototyping)	2	1	5	5



# CM1: Master's Thesis

**Driving  
Simulator**

**Augmented  
Reality**

**Product  
Experience  
Design**

**Design for  
Additive  
Manufacturing**

