Master of Science in Mechanical Engineering

Data Science for Industrial Engineering



Contacts



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Track description

The pervasive use of data in mechanical and industrial engineering paves the way to a paradigm shift in product, process and service lifetime, from design to manufacturing and qualification, from usage to maintenance and end-of-life/recycle/reuse.

The Data Science for Industrial Engineering track is designed to provide students with a solid knowledge of the most advanced tools and methodologies for data science to improve their vertical knowledge on engineering problem domains.

The final goal is to enhance students' skills in problem setting and problem solving when real and complex challenges need to be faced. The track includes courses focusing on data acquisition and modelling, artificial intelligence and statistical learning with courses focusing on product design, process and product improvement, manufacturing and maintenance. We foster a multidisciplinary class with students of mathematical and mechanical engineering.

In the final laboratory, students will enjoy an interdisciplinary hands-on experience on data exploration and analysis for real problem-solving.

Skills

Students will learn how to:

- design new solutions to aid decision-making in industrial and mechanical engineering via big data mining
- improve skills in quantitative problem setting and solving thanks to data evidence
- gain expertise in sensing, digital twin development, product and process optimization economic factors).



CM6: Core Courses

Course Title

Energy Conversion Technologies

Control of Mechanical Systems

Dynamics of Mechanical Systems

Machine Design

Advanced Manufacturing Processes A

Design and Management of Production Systems

YEAR	SEM	ECTS	ECTS GROUP
1	1	5	5
1	2	5	5
1	1	5	5
1	2	5	5
1	1	10	10
1	1	10	10

CM6: Track Specific Courses

Course Title

Design and Analysis of Experiments and Response Surface Methodology

Applied Statistics

Edge-Device Based Measurements and Industry Internet of Things

Machine Learning and Model Identification for Mechanical Systems

Digital Twin for Health and Usage Monitoring

Artificial Neural Networks and Deep Learning

Computational Statistics

Nonlinear Optimization

Bayesian Statistics

Nonparametric Statistics

Elective courses

(Product Digital Twin, Digital Twins of Production Systems B, Quality Data Analysis B, Digital Manufacturing, ...)

Lab course

(Data Science for Industrial Engineering)



YEAR	SEM	ECTS	ECTS GROUP
1	2	10	10
1	2	10	10
2	1	5	
2	2	5	5
2	1	5	
2	1	5	
2	1	5	
2	2	5	10
2	1	5	
2	1	5	
2	1-2	5	15
2	2	5	5

CM6: Master's Thesis

Big-data mining in additive manufacturing and bioprinting Digital twin for systems health monitoring and predictive maintenance

Reinforcement learning in manufacturing systems control



Bayesian optimization for autonomous vehicles