CM6 Data Science for Industrial Engineering

LEARNING OBJECTIVES

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 augment their vertical knowledge of engineering problem domains.

PRE-REQUISITES

The recommended prerequisites for the Data Science for Industrial Engineering track are the courses in fundamental statistics, applied statistics, and basic knowledge of Mechanical Engineering design, manufacturing, and control.

CM6 Data Science for Industrial Engineering

LEARNING OUTCOMES

The Data Science for Industrial Engineering track aims to equip students with a blend of skills at the intersection of data science and industrial engineering. Specific learning outcomes include: 1) Advanced Analytical Skills to solve complex engineering problems using data-driven approaches (i.e., AI, machine learning and statistical models) to predict, optimize, and enhance industrial processes; 2) Problem-Setting and Solving to identify, formulate, and solve engineering problems specific to the industrial sector by applying data science techniques; 3) Project Management and Decision Making considering data-driven decision-making processes that consider economic, environmental, and social impacts; 4) Communication and Teamwork to work effectively in multidisciplinary teams, students will learn to present complex data insights and engineering solutions clearly and persuasively to a variety of audiences. By completing this track, students are expected to emerge as professionals capable of leveraging data science to drive innovation and efficiency in industrial engineering projects and operations.

CM6 Data Science for Industrial Engineering

JOB OPPORTUNITIES

Upon completing the track, students will be well-equipped for various jobs, e.g., data scientist/analyst, process improvement engineer, product development analyst, engineering and data science consultant, research and development engineer, and systems engineer. These jobs span various industries, including automotive, aerospace, electronics, healthcare, and energy.

PARTNER UNIVERSITIES

The Data Science for Industrial Engineering track has established connections with prominent European and international academic institutions, facilitating opportunities for students to conduct thesis works in collaboration with partner companies (e.g., Leonardo, Siemens, GE additive, Ferrari) and universities among which Technische Universität München (TUM, Germany), Chalmers Tekniska Högskola (Chalmers, Sweden), Georgia Institute of Technology (Georgia Tech, USA), and Massachusetts Institute of Technology (MIT, USA).

CM6 Data Science for Industrial Engineering

1 YEAR COURSES
60 ECTS

40 ECTS

	ECTS
Control of Mechanical Systems	5
Dynamics of Mechanical Systems	5
Energy Conversion Technologies	5
Machine Design	5
Advanced Manufacturing Processes A	10
Design and Management of Production Systems	10

20 ECTS

	ECTS
Design and Analysis of Experiments and Response Surface Methodology	10
Applied Statistics	10

CM6 Data Science for Industrial Engineering

2 YEAR COURSES

40 ECTS + 20 ECTS Master's Thesis

5 ECTS

	ECTS
Digital Twin for Health and Usage Monitoring	5
Edge-Based Sensing and Industrial Internet of Things	5
Machine Learning for Mechanical Systems	5

10 ECTS

	ECTS
Artificial Neural Networks and Deep Learning	5
Computational Statistics	5
Bayesian Statistics	5
Nonlinear Optimization	5
Nonparametric Statistics	5

CM6 Data Science for Industrial Engineering

20 ECTS

	ECTS
Vision Based 3D Measurements	5
Autonomous Vehicles	5
Product Digital Twin	5
Digital Twins of Production Systems B	5
Quality Data Analysis B	5
Digital Manufacturing	5
Smart Maintenance Management	5
One (or more) of the above courses of 5 ECTS	5
Open Couse	5

5 ECTS

	ECTS
LAB - Data Science for Industrial Engineering	5